BIOLOGICAL EVALUATION OF GYPSY MOTH INFESTATIONS

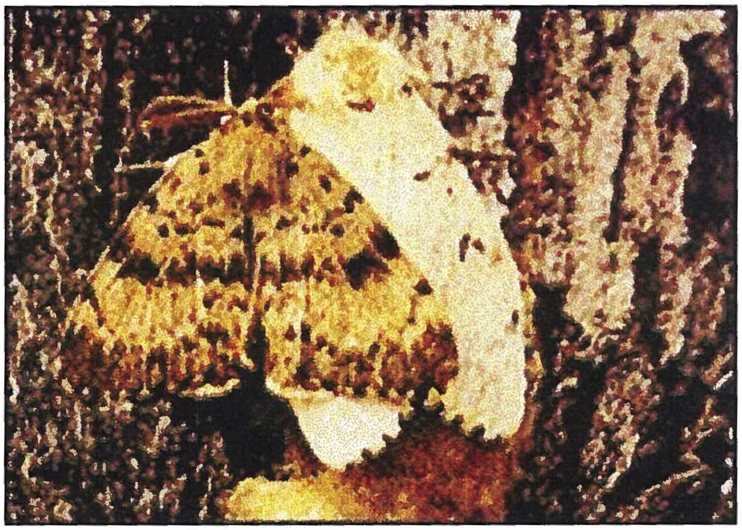
and

PRE-SUPPRESSION ASSESSMENT OF PROPOSED SPRAY BLOCKS

on the

MONONGAHELA NATIONAL FOREST, WEST VIRGINIA

2001



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SUMMARY

The gypsy moth, *Lymantria dispar* (Linneaus), infestations first caused major defoliation on the Monongahela National Forest (MNF), West Virginia, in the early 1990s. Following the collapse of these infestations in 1995, this major pest of oak forests remained at low population densities until outbreak densities reappeared in 2000. That year and again in 2001, this species caused unacceptable levels of defoliation each year on nearly 50,000 acres, primarily in the eastern and southern portions of the MNF.

This report presents a biological evaluation of the current gypsy moth situation on the MNF and reintroduces the gypsy moth integrated pest management (GMIPM) strategy to guide gypsy moth management on the MNF in FY 2002. The strategy for managing gypsy moth infestations on the MNF under a GMIPM approach had been developed jointly by the MNF and FHP staffs and implemented in 1992 when outbreaks of this major forest pest first appeared on the MNF.

The biological evaluation of current gypsy moth infestation on the MNF was based on egg mass surveys conducted during September and October 2001. Surveys established the current population densities that were used to predict 2002 defoliation in 35 Survey Units containing forest stands of susceptible oak type. There were 13 units on the Cheat/ Potomac RD, 4 units on the Greenbrier RD and 18 units on the Marlinton/White Sulphur RD. Survey results provide the data for predicting where gypsy moth infestations in 2002 would result in defoliation exceeding damage thresholds for larval nuisance and associated light to moderate defoliation, and the permanent damage of moderate to severe defoliation leading to tree decline, dieback and mortality.

Fourteen proposed spray blocks within these Survey Units, totaling 13,206 acres and encompassing these gypsy moth infestations, were jointly identified by the MNF and FHP as candidates for spraying in 2002. Forest resources impacts were assessed in terms of the MNF's traditional resources values of timber, wildlife and recreation, and non-traditional resources values of sustaining ecosystem health, biodiversity and T&ES species. However, assessment of gypsy moth defoliation trends in these 14 led to the consideration of only 13 proposed spray blocks totaling 13,122 acres for treatment in 2002. Defoliation was predicted to exceed 50% in 11 of those spray blocks chosen. Slightly lower defoliation was predicted in two spray blocks also sprayed in 2001.

Criteria for establishing treatment alternatives were developed through NEPA scooping during previous suppression projects. The no action alternative would rely on the largely unpredictable, but at times effective, natural control of gypsy moth populations exerted by the gypsy moth specific larval pathogens, NPV and fungus. Proposed aerial spraying of biological insecticides, when gypsy moth larvae are most vulnerable and defoliation is minimal, more predictably prevents unacceptable damage to forest resources than relying on natural controls.

It is recommended the MNF give serious consideration to the spray treatment alternative.

INTRODUCTION AND BACKGROUND

The gypsy moth, *Lymantria dispar* (Linneaus), infestations first caused major defoliation on the Monongahela National Forest (MNF) in West Virginia in the early 1990s. Following the collapse of these infestations in 1995 from the gypsy moth fungus, this forest pest remained at low population densities until outbreak densities reappeared in 2000.

During May and June of 2000, a forested area of nearly 42,420 acres within the proclamation boundary of the Monongahela National Forest (MNF) were defoliated by larvae of the gypsy moth, *Lymantria dispar* (Linneaus). Of this acreage, 12,246 acres were moderately to heavily defoliated (> 50 % foliage removed) and 8,363 acres were lightly to moderately defoliated (< 50 % foliage removed).

Areas of the MNF totaling 14,381 acres were aerially sprayed in May 2001 with *Bacillus thuringiensis* var. *kurstaki* (Btk). The objective of the treatment was to prevent additional unacceptable damage to forest resources from concentrated high-density gypsy moth populations within areas defoliated in 2000.

Outside the acreage sprayed in 2001, gypsy moth defoliation within the proclamation boundary increased slightly to about 49,803 acres. Nearly all of this forested area (45,526 acres) was heavily defoliated; a much smaller amount (4,277 acres) was moderately defoliated.

Treatments are done for the following reasons: 1) to prevent nuisance and aesthetic loss in developed recreation areas; 2) to reduce tree mortality and maintain wildlife habitat where management goals are timber and wildlife oriented; 3) to enhance visual quality for dispersed recreation; and, 4) to promote biodiversity through protecting forest health and habitat for non-target species of special concern, and for threatened and endangered species.

There have been no forest damage surveys to quantify tree mortality resulting from the gypsy moth infestation on the MNF in the early 1990's. However, in similar susceptible oak forests in Pennsylvania, Maryland, Virginia, and the eastern panhandle of West Virginia, gypsy moth infestations have caused substantial oak mortality in some stands of up to 80% loss of stand basal area stocking.

Impacts on timber production and the permanent alteration of tree mortality on forest stand structure for wildlife habitat and biodiversity were documented by research and management in these states. The adverse impacts of larval nuisance, defoliation, and tree mortality on people and trees at developed recreation sites also have been documented.

OBJECTIVES

The objectives of this biological evaluation within the context of GMIPM were to: 1) generally estimate gypsy moth population densities within specific Survey Units containing forest stands of susceptible oak on the MNF for three RDs --Cheat/ Potomac RD, the Greenbrier RD and the Marlinton/White Sulphur RD; 2) reasonably predict the defoliation expected for these Survey Units in 2002 to determine how the damage caused by those populations would impact forest resources during the next growing season; and, 3) select proposed spray blocks based on defoliation trends and their likely impacts; 4) develop environmentally responsible and economically feasible treatment alternatives to suppress those populations posing the greatest risk to national forest resource values and uses while sustaining habitat and species diversity.

GYPSY MOTH INTEGRATED PEST MANAGEMENT (GMIPM)

The following approach to GMIPM is a slightly modified version of that developed for the MNF in FY 1993 by Robert Acciavatti, FHP-Morgantown, and presented at the Potomac RD on Wednesday, November 18, 1992. The earlier approach is based on the white paper entitled “Post AIPM Gypsy Moth Management within the Proclamation Boundary of the Monongahela National Forest”, jointly agreed to by R-9, MNF and NA, FHP on September 28, 1992, at the MNF SO, Elkins, WV. Presentation of GMIPM in this report is necessary for documenting this approach as additional Ranger Districts and new personnel in the SO and all RDs become involved with management decisions to deal with gypsy moth infestations now and in the future.

GMIPM Strategy and Procedures in 2001

1. Aerial sketchmapping surveys by USDA Forest Service, Forest Health Protection Staff, and the West Virginia Department of Agriculture, locate and map gypsy moth populations at outbreak densities that had defoliated forested areas of the MNF.

In 2001, portions of three MNF RDs were considered for GMIPM as follows:

- Cheat/ Potomac RD – Big Mt., Cave Mt., Fore Knobs of Allegheny Front, Middle Mt., Peters Mt., Pretty Ridge, Seneca Rocks, Tract Hill descriptive location and GPS coordinates of plot.
- Greenbrier RD – Chestnut Ridge, Lee Bell, Sugar Camp.
- Marlinton/White Sulphur RD – Allegheny Mt.,Beaver Lick Mt.,Brushy Mt., Buckley Mt., Elk River, Grindstone Knob, High Top, Lake Sherwood, Lockridge Mt., Mad Tom Knob, Marlin Mt., Meadow Creek Mt., Michael Mt., Middle Mt., Paddy Knob, Thorny Creek.

2. Survey Units for gypsy moth egg mass surveys are delineated within those portions of the defoliated areas of the MNF with MNF Land Management Plan goals of timber (3.), wildlife habitat (6.1), dispersed recreation with salvage only (6.2), and developed recreation areas.

For 2001, there were 35 Survey Units distributed by MNF RD as follows:

- Cheat/ Potomac RD -- 13 units

- Greenbrier RD -- 4 units
- Marlinton/White Sulphur RD -- 18 units

3. In each Survey Unit, 1/40-acre survey plots are taken where oaks, the most susceptible gypsy moth host tree species, predominate. The plots are to be reasonably distributed throughout each Survey Unit with the number of plots based on available time and personnel.

During September and October 2001, FHP-Morgantown Staff, and Dave Curry, FHP contract employee, under the supervision and direction of Robert Acciavatti, established 1,061 survey plots on the MNF with the following data recorded at each plot:

- descriptive location and GPS coordinates of plot;
- number of new and old gypsy moth egg masses;
- egg mass length for new egg masses;
- presence of *Ooencyrtus* parasitic wasps on egg masses;
- dead larvae killed by virus (NPV) and *Entomophaga* fungus;
- species and diameter for trees within the plot.

Details concerning the survey are presented in the Gypsy Moth Egg Mass Survey Method and Datasheet in the Appendix.

4. FHP used the prediction model of Liebhold, *et al.* (1993) to calculate gypsy moth host type defoliation for each survey plot based on the ratio of new to old gypsy moth egg mass densities per acre and density of new eggs as a function of egg mass length.

5. Damage thresholds to be expected from the predicted defoliation indicate what forest resources values and uses (set as the highest priorities for protection in the MNF Gypsy Moth Management White Paper) would be impacted by different intensities of gypsy moth infestations.

The following chart presents the classes of gypsy moth damage based on host defoliation and damage thresholds, and indicates the MNF forest resources impacted:

Gypsy Moth Damage and Impacts Chart

Gypsy Moth Damage Class	Forest Host Type Defoliation	Gypsy Moth Population Effects and Host Type Damage Thresholds	Monongahela NF Forest Resource Values and Uses Impacted
1	No Defoliation	None	None
2	1 to 50% Defoliation	Larval nuisance to people and visual effects of light to moderate defoliation throughout the growing season	Developed Recreation T&ES; Mgt. 8: Class A visual quality of general forest; nearby private land; RNA
3	51 to100% Defoliation	Larval stripping trees causing their refoliation which increases the risk of tree decline and eventual mortality	Timber sales on high quality sites; hard mast crop; habitat biodiversity; dispersed recreation; T&ES

RNA = Research Natural Area; T&ES = Federally Threatened, Endangered, Sensitive

The damage classes are based on research results and empirical observations as to the effect gypsy moth populations at various densities have on forest trees. For example, summer refoliation of a tree occurs after spring defoliation exceeds 50 percent and leads to depletion of food reserves stored in roots. Such a tree declines in vigor and may be able to recover from one refoliation, but it is unlikely it would recover from two successive years of this damage. These trees depleted of their starch food reserves are highly vulnerable to attacks by phloem-feeding beetles, e.g. the two-lined chestnut borer, and infection by the Armillaria root rot fungus.

6. The Arc View GIS program permits the display of egg mass survey results by plot locations on large-scale sections of MNF maps. This helps visualize the location of potential damage areas.

The defoliation predicted for 2002 on each of the 1,061 egg mass survey plots is shown on the Appendix maps. These are shown in relation to the spray blocks treated in 2001 and proposed for 2002. The following color coded damage classes were used:

Green	MINIMAL
Yellow	LARVAL NUISANCE to VISIBLE DEFOLIATION
Red	TREE CROWN DECLINE, DIEBACK and MORTALITY

7. Based on the MNF Land Management Plan objectives for the Cheat/Potomac, Greenbrier and Marlinton/White Sulphur RDs, decisions are made as to which locations/areas have gypsy moth populations posing the greatest threat to forest resources and uses. The following treatment decision criteria were utilized to establish which locations/areas would benefit most from suppression of the gypsy moth populations in 2002:

Description of Proposed Treatment Unit Criteria for 2002 Suppression

(1) Predicted gypsy moth defoliation in 2002.
(2) Recent gypsy moth defoliation in 2000 and 2001.
(3) Timber values and degree of tree vulnerability to mortality.
(4) Highly sensitive developed/dispersed recreation and scenic areas.
(5) Retreatment of spray block treated during 2001 suppression project.

8. Boundaries and acreage are determined by MNF and FHP for each proposed treatment unit to achieve maximum suppression of potentially damaging gypsy moth populations through contracting for aerial spraying in May when larva begin feeding.

In 2001, the 14 spray blocks proposed for treatment in 2002 totaled 13,206 acres.

9. MNF notifies the public(s) of the intent of the Forest to conduct a gypsy moth spray project. MNF conducts scoping meetings to further identify issues and concerns to be addressed in a Project EA and Decision Notice, and perhaps identify the need for an EIS beyond the current USDA/FS & APHIS EIS.

10. MNF and FHP jointly will plan and organize a spray project using Incident Command System (ICS) to identify key team members and their responsibilities (develop project activities, schedules, contracting, and procurement of personnel, vehicles, aircraft, supplies, etc.).

11. FHP and MNF have established efficacy standards for gypsy moth suppression. Achieving these standards lowers the damage risk to the respective forest resources potentially impacted by gypsy moth defoliation and mortality. A successful project:

1) protects enough foliage (70 percent or more) to keep trees from refoliating; spray block defoliation is assessed and recorded remotely using aerial methods (sketchmapping, photography, or videography flights) in July;
2) reduces gypsy moth populations by 80 percent or more comparing new egg mass densities of the generation sprayed to that in the following generation;
3) maintains residual gypsy moth populations, assessed using new egg mass densities and eggs per mass, below the densities which lead to Damage Class 3 defoliation.

12. FHP will evaluate the project against these standards and report the results.

The Treatment Monitoring Data Base Protocols and Procedures will be followed for data collection, thereby permitting a standard for comparison with results from similar projects, and making it possible to determine reasons for success or failure on each treatment unit.

13. FHP will develop a risk assessment for non-target biodiversity effects from spraying biological insecticides, and will be responsible for non-target monitoring of those insect species most likely to be effected during the spring of spraying.

Many macrolepidopterous moths have an important ecological role in determining biodiversity of unusual ecosystems, such as those in the Spruce Knob-Seneca Rocks NRA. By surveying the moth fauna likely to be feeding and exposed to insecticides in the proposed treatment units during the time for spraying, FHP will document changes in presence and relative abundance of species considered to be of special concern for their rarity in West Virginia, and/or their listing as federally threatened, endangered, or sensitive. Numerous habitats will be surveyed from March to October under cooperative contracts with the West Virginia Division of Natural Resources, Elkins, WV, and The Carnegie Museum of Natural History, Pittsburgh, PA.

RESULTS AND DISCUSSION

Defoliation Predictions for 2002

Table 1 shows the 2002 gypsy moth defoliation predictions for each of the 35 Survey Unit and the MNF Ranger District where these are located. Table 1 also presents the number of survey plots and their distribution by defoliation classes for each Survey Unit. Expressing this distribution as percent of the total plots for each Survey Unit permits comparisons of predicted gypsy moth defoliation between and among Survey Units. A total of 34 large-scale sections of MNF planimetric maps, arranged alphabetically by Survey Unit, are presented in the Appendix to show where the survey plots are located within each Survey Unit.

The greatest potential for moderate to severe defoliation in 2002 exists within those Survey Units with a defoliation prediction exceeding 50% and having the greatest proportion of survey plots falling within the highest defoliation class. Defoliation of this intensity can lead to permanent tree damage (crown decline, dieback and mortality). The greatest potential for light to moderate defoliation in 2002 exists within those Survey Units with a defoliation prediction below 50% and having the greatest proportion of survey plots in the middle defoliation class. Defoliation of this intensity creates only larval densities and defoliation at nuisance levels to recreationists. Survey Units with an extremely low defoliation prediction and having the greatest proportion of survey plots in the lowest defoliation class are likely to have no more than innocuous gypsy moth populations.

Gypsy moth populations with the greatest potential for causing permanent tree damage exist in 14 of the 35 Survey Units surveyed on the MNF in 2001. Nearly half (7 of 18) the Survey Units on the Survey Units are likely to experience gypsy moth defoliation resulting in unacceptable amounts of growth loss or tree mortality. By contrast, none (0 of 4) of the Survey Units on the Greenbrier RD is likely to experience this level of defoliation that leads to permanent tree damage.

Of the remaining 21 Survey Units, 5 are likely to experience more defoliation than elsewhere, but defoliation is likely to remain in the lowest defoliation class. Two Survey Units on the Marlinton/White Sulphur RD (Brushy Mt North and South) have a defoliation prediction approaching 50% with a high proportion of survey plots in the middle defoliation class. Three other Survey Units, 1 on the Marlinton/White Sulphur RD (Middle Mt South), and 2 on the Cheat/Potomac RD (Fore Knobs South, Pretty Ridge) have a defoliation prediction approaching 50%, but without a high proportion of survey plots in the middle defoliation class. Where recreation areas are present in these five Survey Units, gypsy moth larvae themselves and the threat of their defoliation, even at these lower defoliation densities, can be expected to adversely influence the recreation experience.

The remaining 16 Survey Units on these three RDs are predicted to have gypsy moth defoliation at low to innocuous levels, and, therefore, gypsy moth populations would not pose a threat to resources in 2002 except for nuisance defoliation in recreation areas.

The natural control factors operating in the Survey Units were not quantitatively surveyed, but observations indicated that gypsy moth egg mass size for new egg masses was moderate to large with an almost constant presence of *Ooencyrtus kuwanae* parasitic wasps on egg masses. Several dead larvae collected during the survey were found to be harboring resting spores of the gypsy moth fungus, *Entomophaga maimaiga*. This fungus is known to be present wherever gypsy moth is distributed in West Virginia, and was considered to have influenced the successful treatment of gypsy moth infestations sprayed on the MNF in 1995. Therefore, it is likely this fungus will again have an adverse influence on gypsy moth infestations on the MNF especially during wet spring weather. The gypsy moth nucleopolyhedrosis virus was also present in the dead larvae collected, but this gypsy moth pathogen does not kill as quickly and is usually masked by the fungus.

Proposed Spray Blocks for 2002

GMIPM seeks to determine where values are at risk from the current gypsy moth infestations so that spray blocks can be established for suppression consideration for 2002. Pre-, and post-suppression egg mass surveys determine gypsy moth population changes and provide a measure of project effectiveness. In addition, treatment evaluation and non-target lepidopteran monitoring with FHP coordination, insures assessments of forest health impacts resulting from gypsy moth management decisions to spray specified areas. Impacts include those to ecosystem biodiversity and non-target moths in habitats typical of the forest types considered for gypsy moth suppression in this and future years.

Potentially damaging gypsy moth populations in 2002 exist in susceptible forest type within 14 Survey Units (7 on both the Cheat/Potomac RD and Marlinton/White Sulphur RD). Proposed spray blocks within these Survey Units, totaling 13,206 acres and encompassing these gypsy moth infestations, were jointly identified by the MNF and FHP as candidates for spraying in 2002. The spray objective would be to protect forest areas managed for timber, wildlife, recreation, ecosystem biodiversity, and T&ES species. Table 2 presents these proposed spray blocks along with the RD where they are located. Also for each block are shown the acreage, number of survey plots, predicted defoliation, and distribution of survey plots among the defoliation classes. Each block is delineated and labeled with a text box on the Appendix Maps corresponding with the Survey Unit name.

Nine of the proposed spray blocks have a defoliation prediction exceeding 50% with the greatest proportion of survey plots falling within the highest defoliation class. Two proposed spray blocks have a defoliation prediction approaching 50% with the greatest proportion of survey plots in the highest defoliation class. These 11 proposed spray blocks should be considered for treatment in 2002.

Two proposed spray blocks have a defoliation prediction below 50% with the greatest proportion of survey plots in the middle and lowest defoliation class. These two proposed spray blocks should be considered for treatment in 2002, primarily because they were spray blocks in 2001. On the other hand, one proposed spray block had a defoliation prediction well below 50% with the greatest proportion of survey plots in lowest defoliation class. This single proposed spray block should be dropped from further consideration for treatment in 2002.

The gypsy moth infestations on the Cheat/Potomac RD have been in this part of the MNF since the early 1990s, whereas infestations on the Marlinton/White Sulphur RD developed only in the last few years at the leading edge of the generally infested area in West Virginia. The recent history of gypsy moth infestations is one of expansion into this southern part of the MNF with abundant susceptible tree species. Considering these facts and the high density gypsy moth populations found during the surveys for this biological evaluation, FHP predicts that gypsy moth populations will continue to be a chronic problem in the eastern parts of the MNF. Furthermore, gypsy moth populations are likely to spread and build to outbreak densities on the southern end of the MNF over the next several years beyond the general areas discussed in this report.

Treatment Alternatives

The MNF has two gypsy moth management options in 2002 that are responsive to issues identified through NEPA scooping in previous Environmental Assessment for gypsy moth suppression projects.

1) no action against the gypsy moth;
2) spray proposed blocks with microbial insecticides to prevent nuisance, defoliation, and subsequent tree mortality;

For those nine proposed spray blocks with gypsy moth defoliation predictions exceeding 50%, treatment would be expected to prevent moderate to severe defoliation that results in permanent tree damage and loss of susceptible host forest type. For those two proposed spray blocks with gypsy moth defoliation predictions approaching 50%, treatment would be expected to prevent larval nuisance and light to moderate defoliation that adversely affects recreation values and uses.

If the no action alternative is chosen in 2002, outbreak population densities and their accompanying defoliation predictions within the 11 proposed spray blocks are likely to cause moderate to severe defoliation and have adverse impacts for national forest resources. Of the natural controls of gypsy moth from parasitic wasps, NPV and fungus, only the latter pathogen is likely to cause a major collapse in the outbreak if wet weather coincidences with larval feeding in the late spring. A large portion of the current gypsy moth infestations lies in the leading edge of the generally infested area along the southward expansion of gypsy moth. It is under these circumstances that increased risks from the expanding outbreaks can most impact the forest by increasing tree mortality, especially in oak type, especially where stands have been defoliated during one or more previous years.

RECOMMENDATIONS

It is recommended that MNF decide in favor of the spray treatment alternative. National Forest resource values, such as, recreation, timber, wildlife, species biodiversity and T&ES species, would be protected by suppressing potentially damaging gypsy moth populations in areas of the Cheat/Potomac RD and Marlinton/White Sulphur RD where these values are at greatest risk. This decision would prevent additional unacceptable damage to forest resources values and uses caused by the moderate to severe gypsy moth defoliation likely during 2002, especially those areas defoliated in 2000 and 2001.

APPENDIX

Gypsy Moth Egg Mass Survey Method and Datasheet

Table 1. Monongahela NF 2002 Gypsy Moth Defoliation Predictions by Survey Unit

Table 2. Monongahela NF 2002 Gypsy Moth Defoliation Predictions by Spray Block

Monongahela NF 2001 Gypsy Moth Egg Mass Survey Maps by Survey Unit showing the Location of Survey Plots by Defoliation Prediction Class and Spray Blocks Treated in 2001 and Proposed for 2002

Gypsy Moth Egg Mass Survey Method and Datasheet

Survey Planning: Delineate the area to be surveyed on a 1:24000 quadrangle topographic map and distribute the plot such that the entire survey area will be sampled. The number of sample points will be based on available time and desired precision but a rule of thumb is a minimum of 4 plots per 25 acres (+) 1 additional plot per 25 acres to be surveyed.

Materials needed: binoculars, compass, 5 stakes, 18.6 foot tape/string, tree identification guide, data sheets, map of site calculator.

1) **Navigate to the survey plot.** The plot should lie within a forested area (with susceptible host species) and be more than 25 feet from the edge of the forest.

2) **Select the center point of your plot.** This should be done *randomly*. Do not place your cent point in areas where egg masses are clumped in high densities.

3) **Set up your plot.** Use a tape/string to set up stakes to help you visualize a circular plot. Measure 18.6 feet out in four directions, perpendicular to each other, from your selected center point, setting a flagged stake at each point.

   PLEASE ASSESS THIS ITEM CAREFULLY – You will need to determine **new from old egg masses**. Examine egg masses by gently pressing them with your finger. New egg masses feel full, and contain tiny hard eggs that will 'pop' between fingernails. Old egg masses look very similar to new ones, however, old egg masses will usually appear lighter in color unless they have been sheltered from the sun and weather. Old egg masses collapse when touched – they feel flat and empty and contain few, if any eggs. Old egg masses will sometimes appear torn or have holes in them and will not "pop" when squeezed between fingernails.

4) **Enter basic information on the data sheet.** Add the crew block number, plot number date, and the names of members to the top of the data sheet.

   You will need to **measure 5 NEW egg masses** for their length. Randomly select five egg masses – they can be the first 5-10 you observe if you wish. Measure the longest extent of the egg mass as its length in millimeters (mm). Length is generally measured up-and down on the side of trees, but on limbs and understory materials, they can extend in any direction. Enter these on the bottom of the data sheet. If you fail to find at least 5 inside your plot, find and measure egg masses nearby if possible.

5) **Count and tally old and new egg masses in the understory.** Look on smaller trees, woody vegetation, downed limbs and logs. Egg masses may be found under peeling bits of bark and in dead tree cavities as well. Look only on the larger objects, there is no need to pick up every twig but be through. Replace any items you move back where they were originally to impact habitat as little as possible.

6) **For each large tree within your plot:**

   a) **Enter the number of the tree within your plot:**

b) **Identify the tree** to species if possible using common name (e.g., black oak). Identification to major taxonomic group (e.g., oak vs. maple) is sufficient for this survey.

c) **Measure/estimate the diameter in inches** (width) of the tree at chest level. Enter this in the column marked DBH (for Diameter at Breast Height).

d) **General guidance for counting:** Count all egg masses in understory and below 6' on plot trees. Count individual egg masses above 6' on plot trees up to 50. After you have 50 counted you may begin to estimate numbers in groups of 25. Example: If you count 50 in total (above 6 feet) and there are still plenty more, estimate in 25s for the rest of the count on that tree.

e) **Count and tally all old and new egg masses in understory/ground and below 6 feet on plot trees. Enter results on the data sheet. Avoid double counting.**

If there are no egg masses on ground, understory or below 6 ft in the plot and in order to determine **% new versus old egg masses,** you will need to go outside the plot to find egg masses to determine this ratio, but do not incorporate these egg masses into the plot data itself, use it only to determine % new egg masses. (Example: no egg masses below 6', outside of plot 10 egg masses found, 5 of which are new. Record % new but do not add the number of egg masses to the total count.

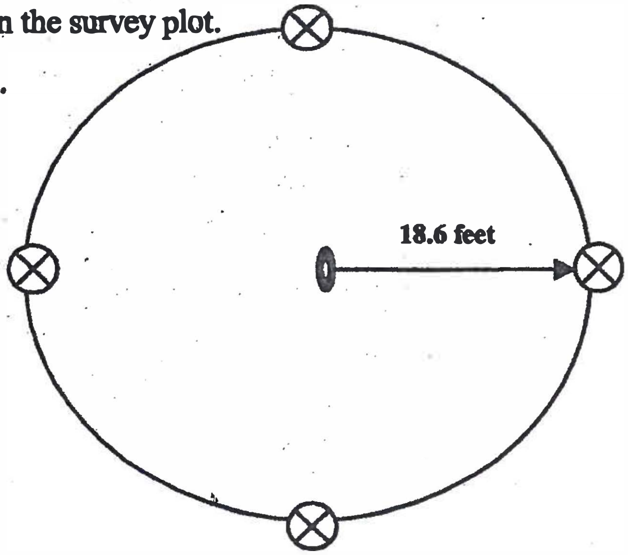
f) **Count egg masses above 6 feet.** Count all egg masses on plot trees, even on branches that may extend beyond your plot. Do not include egg masses noted on overhead branches from trees with trunks that are outside your plot. Use binoculars as necessary – egg masses may be at any height

Note: If you observe no egg masses under 6 ft, and you were unable to find any adjacent to the plot, you will need to determine the number of new egg masses without the new vs old ratio. To do this you will need be very careful and try to determine if the egg mass is new by sight only, paying close attention to color and condition of the egg mass. Has the color faded? Is it full of holes? Is it torn looking? In this situation you will be counting only new egg masses so enter 100% new egg masses on the data sheet.

g) **Total the number of egg masses** on this tree in the last column.

h) **Repeat for all larger trees** that have trunks in the survey plot.

7) **Gather stakes and continue on to your next plot.**



1/40 ACRE EGG MASS SURVEY PLOTS (r = 18.6 Ft)

LOCATION: ____

DATE: ______________________ BLOCK (or other ID): ________________

CREW: ____________ PLOT # ______ GPS Coordinates ________________

Tree #	Species	DBH	Total Number of Egg Masses (old + new) above 6'		
Understory & Ground Plot Trees Below 6'			New	Old	
		GRAND TOTALS			

$\frac{\text{New}}{\text{New+ Old}}$ = %NEW egg masses → % NEW egg masses ________

Total NEW Above 6' = Grand total Above 6' x (% New) → Total NEW Above 6' __________

PLUS (+) Total NEW in understory /ground below 6 feet __________

TOTAL NEW EGG MASSES = ________

X 40

Total egg masses per acre ☐

(Do not calculate)

Egg Mass Size (measure length in millimeters)

(Measure only new egg masses)

☐ ☐ ☐ ☐ ☐

COMMENTS: fungus/, parasites?

Monongahela NF 2002 Gypsy Moth Defoliation Predictions by Survey Unit showing Distribution of Plots by Defoliation Classes within each Survey Unit

Class 1 = No Defoliation; Class 2 = 1-50 % Defoliation; Class 3 = 51-100 % Defoliation

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Monongahela National Forest Ranger District	Survey Unit Name	Survey Plots	% Predicted Defoliation	% Plots Class 1	% Plots Class 2	% Plots Class 3
Marlinton-Wh.Sulphur	Allegheny Mt	11	24	45	36	18
Marlinton-Wh.Sulphur	Beaver Lick Mt	26	2	92	8	0
Cheat-Potomac	Big Mt	41	34	48	15	37
Marlinton-Wh.Sulphur	Brushy Mt North	25	46	4	60	36
Marlinton-Wh.Sulphur	Brushy Mt South	46	43	11	52	37
Marlinton-Wh.Sulphur	Buckley Mt	74	71	4	16	80
Cheat-Potomac	Cave Mt	49	54	26	14	60
Greenbrier	Chestnut Ridge	10	12	80	10	10
Marlinton-Wh.Sulphur	Elk River	11	0	100	0	0
Cheat-Potomac	Fore Knobs Cable	47	75	3	14	83
Cheat-Potomac	Fore Knobs Middle	17	54	23	18	59
Cheat-Potomac	Fore Knobs North	36	59	3	31	66
Cheat-Potomac	Fore Knobs South	19	46	32	16	52
Marlinton-Wh.Sulphur	Grindstone Knob	15	62	0	33	67
Marlinton-Wh.Sulphur	High Top	18	68	0	28	72
Marlinton-Wh.Sulphur	Lake Sherwood	26	17	58	30	12
Greenbrier	Lee Bell North	36	28	47	22	31
Greenbrier	Lee Bell South	22	22	55	32	13

Monongahela NF 2002 Gypsy Moth Defoliation Predictions by Survey Unit showing Distribution of Plots by Defoliation Classes within each Survey Unit

Class 1 = No Defoliation; Class 2 = 1-50 % Defoliation; Class 3 = 51-100 % Defoliation

				Map Symbol		
				🟢	🟡	🔴
Monongahela National Forest Ranger District	Survey Unit Name	Number of Plots	% Predicted Defoliation	% Plots Class 1	% Plots Class 2	% Plots Class 3
Marlinton-Wh.Sulphur	Lockridge Mt	59	20	49	41	10
Marlinton-Wh.Sulphur	Mad Tom Knob	12	70	0	25	75
Marlinton-Wh.Sulphur	Marlin Mt	56	64	7	20	73
Marlinton-Wh.Sulphur	Meadow Creek Mt	61	75	2	8	90
Marlinton-Wh.Sulphur	Michael Mt	18	11	67	28	5
Marlinton-Wh.Sulphur	Middle Mt North	61	69	3	22	75
Marlinton-Wh.Sulphur	Middle Mt South	24	42	33	25	42
Cheat-Potomac	North Fork Mt Middle	39	65	10	23	67
Cheat-Potomac	North Fork Mt North	65	59	8	26	66
Cheat-Potomac	North Fork Mt South	12	10	67	33	0
Marlinton-Wh.Sulphur	Paddy Knob	13	2	92	8	0
Cheat-Potomac	Peters Mt	17	39	24	29	47
Cheat-Potomac	Pretty Ridge	11	43	55	0	45
Cheat-Potomac	Seneca Rocks	20	22	55	25	20
Mar.-W.S./Greenbrier	Sugar Camp	24	5	83	17	0
Marlinton-Wh.Sulphur	Thorny Creek	14	13	64	29	7
Cheat-Potomac	Tract Hill	26	66	8	19	73

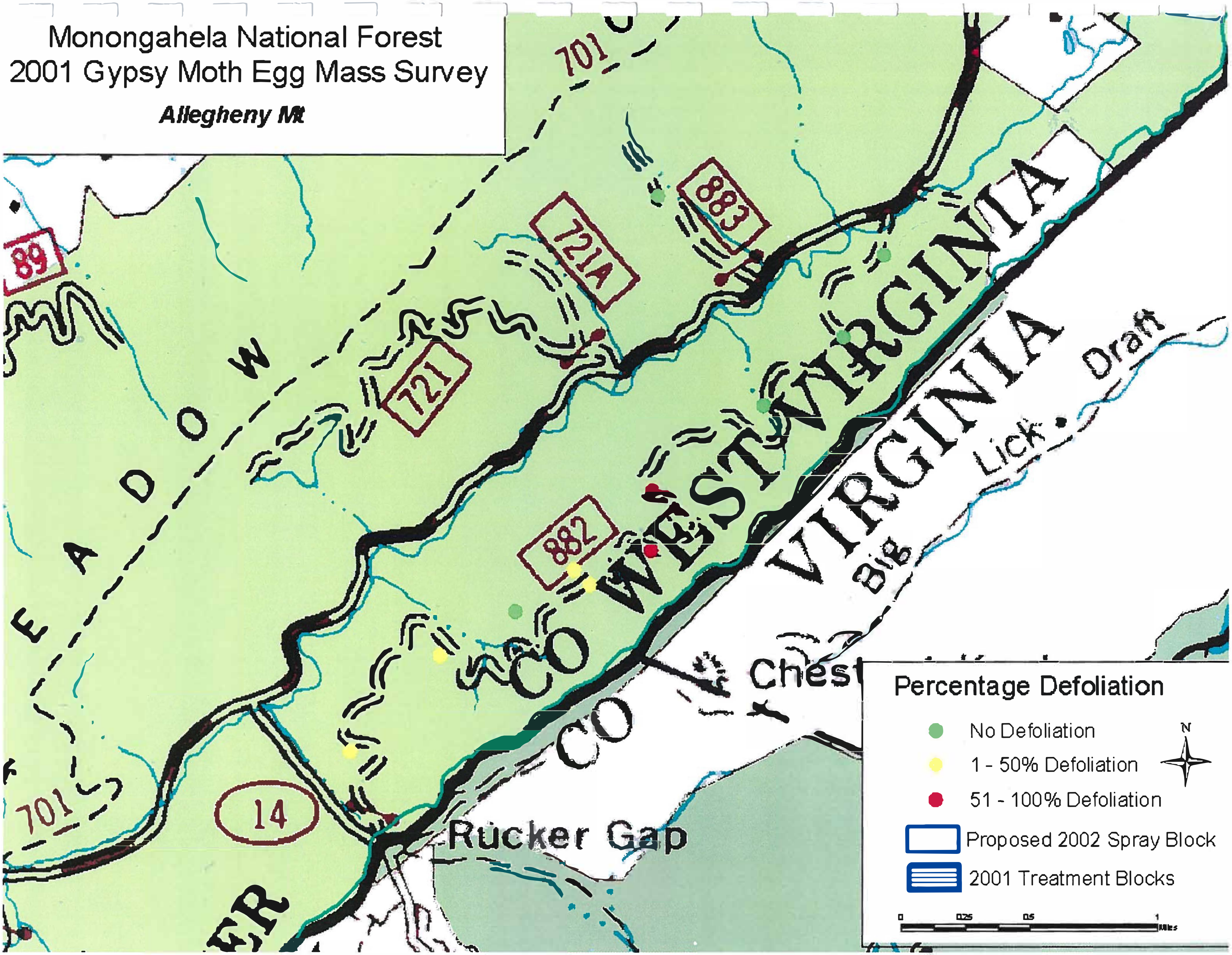
Monongahela NF 2002 Gypsy Moth Defoliation Predictions by Proposed Spray Blocks showing Distribution of Plots by Defoliation Classes within each Block

Class 1 = No Defoliation; Class 2 = 1-50 % Defoliation; Class 3 = 51-100 % Defoliation

					Map Symbol		
					🟢	🟡	🔴
Monongahela National Forest Ranger District	Proposed Spray Block Name	Acres	Survey Plots	% Predict. Defoliation	% Plots Class 1	% Plots Class 2	% Plots Class 3
Cheat-Potomac	Big Mt	509	14	64	14	14	71
Marlinton-Wh.Sulphur	Brushy Mt North	1165	12	50	0	42	58
Marlinton-Wh.Sulphur	Brushy Mt South	1580	13	46	15	23	62
Cheat-Potomac	Cave Mt North	654	10	54	0	50	50
Cheat-Potomac	Cave Mt South	1070	20	80	5	10	85
Cheat-Potomac	Eagle Rock	84	7	12	86	0	14
Cheat-Potomac	Fore Knobs Cable	986	25	82	0	0	100
Greenbrier	Lee Bell North	369	19	30	42	26	32
Greenbrier	Lee Bell South	402	15	32	33	47	20
Marlinton-Wh.Sulphur	Meadow Creek Mt	4625	59	75	2	8	90
Cheat-Potomac	North Fork Mt Lookout	320	11	88	0	0	100
Cheat-Potomac	North Fork Mt Redman	193	5	54	40	0	60
Cheat-Potomac	Pretty Ridge	63	5	57	40	0	60
Cheat-Potomac	Tract Hill	1093	21	74	5	10	86

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Allegheny Mt


701
89
883
721A
721
EADOW
882
CO WEST VIRGINIA
VIRGINIA
CO
Big Lick Draft
Chest
Rucker Gap
701
14
ER
N
0
0.25
0.5
1
Miles

Percentage Defoliation

● No Defoliation

● 1 - 50% Defoliation

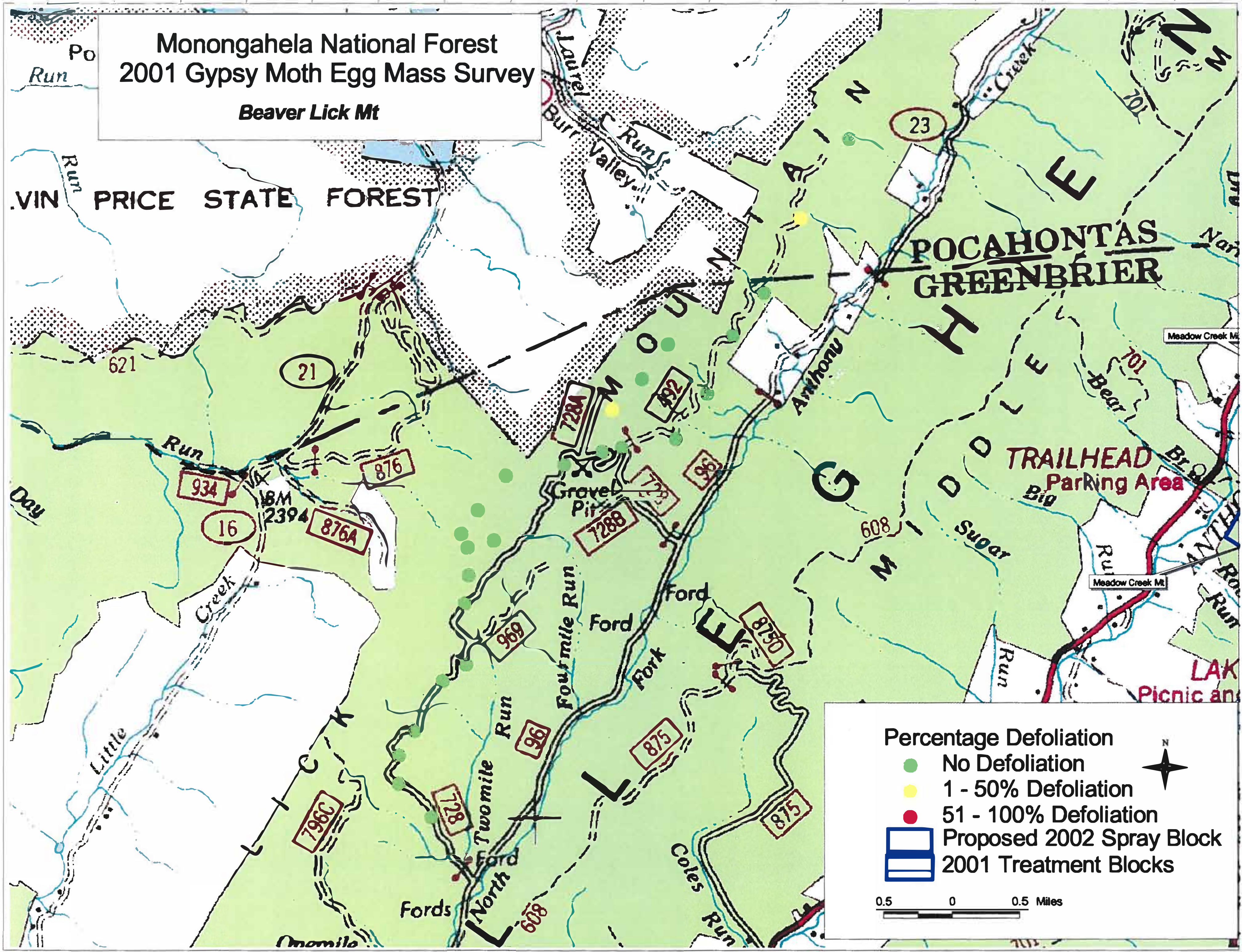
● 51 - 100% Defoliation

☐ Proposed 2002 Spray Block

▤ 2001 Treatment Blocks

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Beaver Lick Mt


VIN PRICE STATE FOREST
Po
Run
Run
Laurel
Burr Valley
Run
Creek
23
701
N
M
A
I
N
T
N
U
O
M
E
POCAHONTAS
GREENBRIER
H
Meadow Creek Mt
Meadow Creek Mt
621
21
Run
934
BM 2394
16
876
876A
Day
Creek
Little
728A
992
728
96
1288
Gravel Pit
Anthony
G
701
Bear
E
L
D
D
I
M
TRAILHEAD
Parking Area
Big
Sugar
608
Br
Run
Run
Run
LAK
Picnic an
969
Fourmile Run
Ford
Ford
Fork
Ford
875
875
875D
E
L
96
Twomile
Run
728
796C
L
I
C
K
Fords
North
608
Coles
Run
Onemile
701

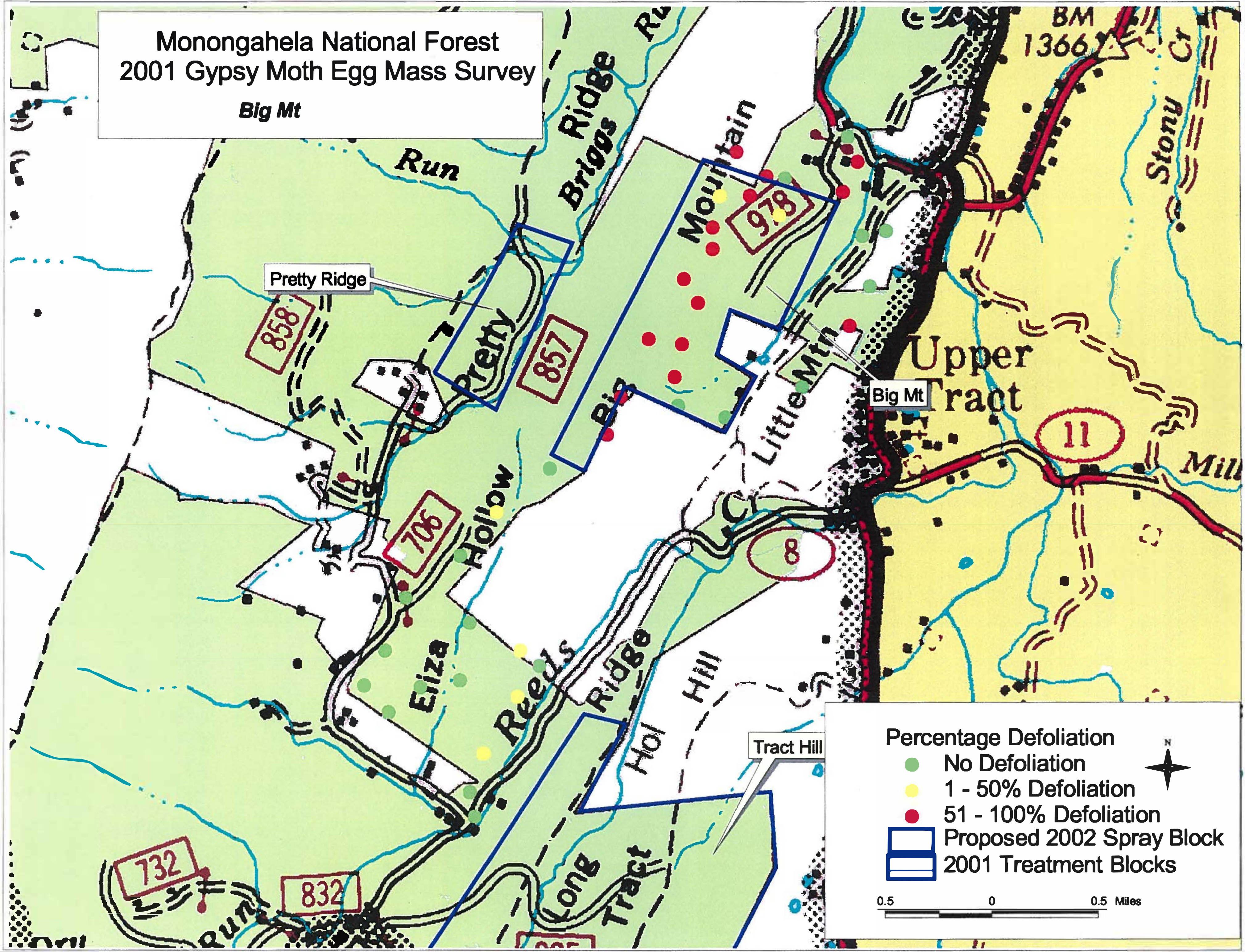
Percentage Defoliation

- 🟩 No Defoliation
- 🟨 1 - 50% Defoliation
- 🟥 51 - 100% Defoliation
- ☐ Proposed 2002 Spray Block
- ☐ 2001 Treatment Blocks

N
0.5
0
0.5 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Big Mt

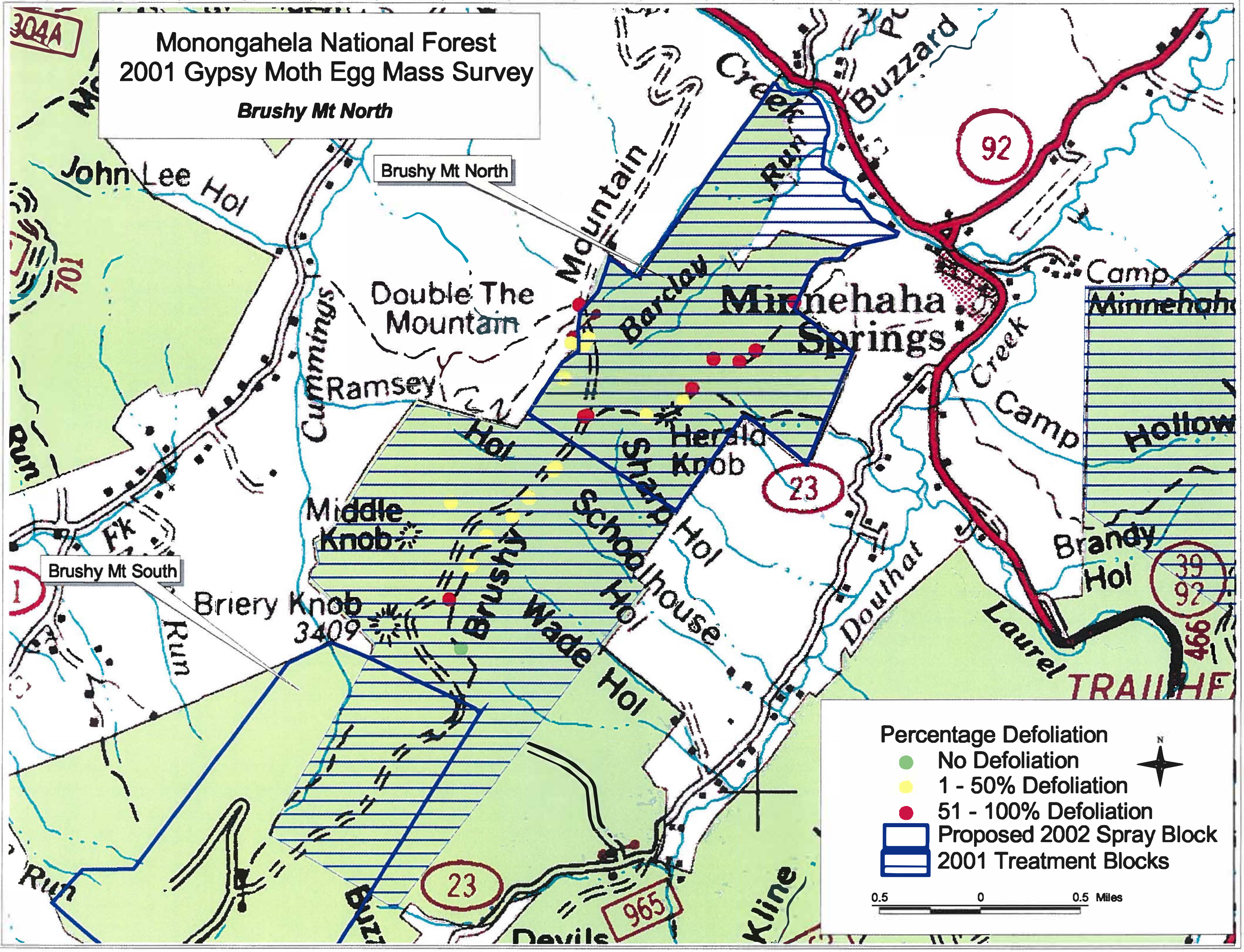

Pretty Ridge
Big Mt
Tract Hill
Briggs Ridge
Run
Big Mountain
Pretty
Hollow
Eliza
Reeds Ridge
Little Mtn
Cr
Hol Hill
Long Tract
Upper Tract
Stony Cr
Mill
BM 1366
858
857
978
706
11
8
732
832
N
0.5
0
0.5 Miles

Percentage Defoliation

- ● No Defoliation
- ● 1 - 50% Defoliation
- ● 51 - 100% Defoliation
- ☐ Proposed 2002 Spray Block
- ☐ 2001 Treatment Blocks

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Brushy Mt North

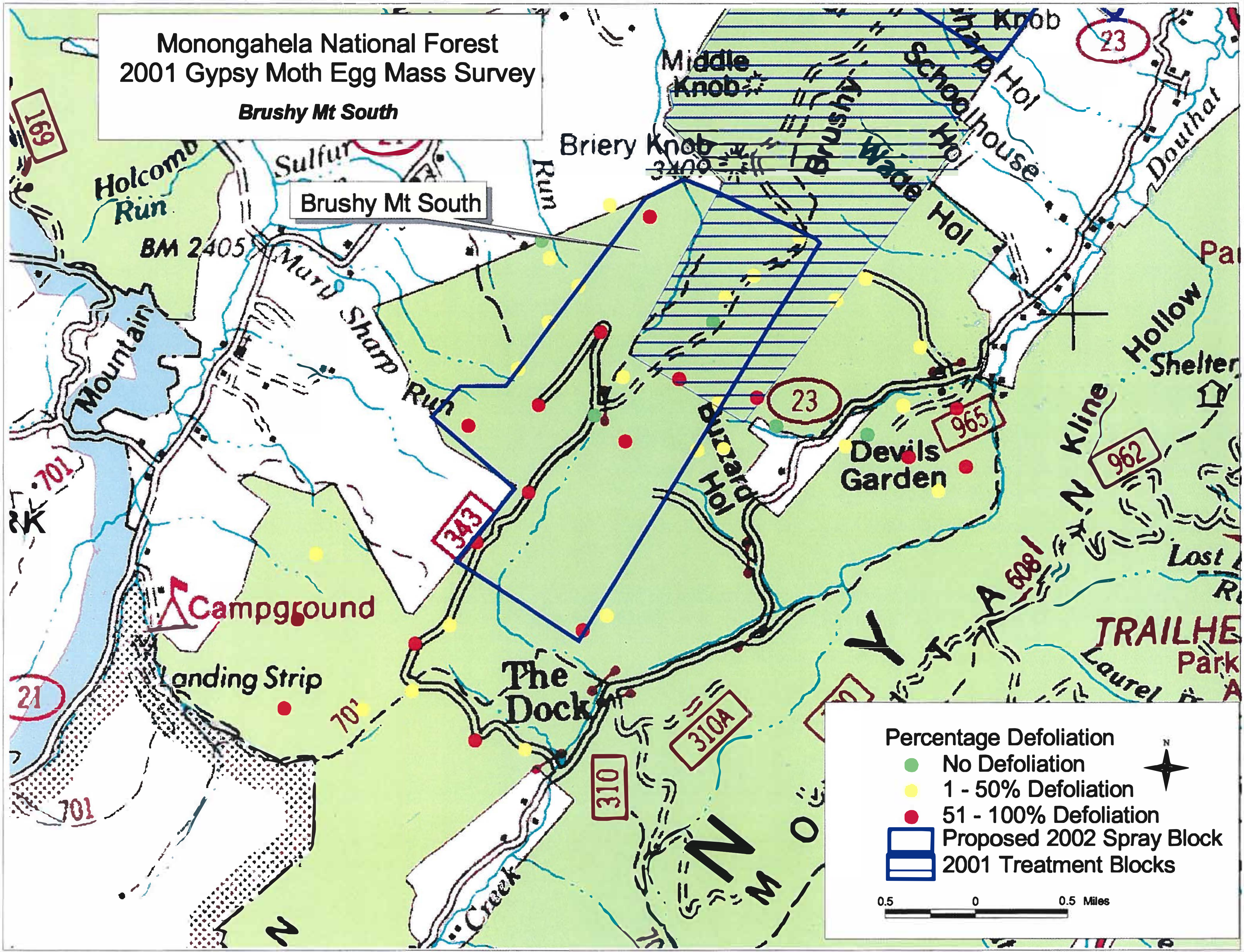

Brushy Mt North
Brushy Mt South
304A
701
92
23
39
92
466
965
John Lee Hol
Mountain
Creek
Run
Buzzard
Double The Mountain
Cummings
Ramsey
Hol
Barclay
Minnehaha Springs
Camp
Minnehaha
Creek
Camp
Hollow
Herald Knob
Sharp
Schoolhouse
Hol
Middle Knob
Brushy
Wade
Hol
Briery Knob
3409
Fk
Run
Douthat
Brandy
Hol
Laurel
TRAILHE
Kline
Devils
Buzz
Run
N
0.5
0
0.5 Miles

Percentage Defoliation

- 🟢 No Defoliation
- 🟡 1 - 50% Defoliation
- 🔴 51 - 100% Defoliation
- ☐ Proposed 2002 Spray Block
- ▤ 2001 Treatment Blocks

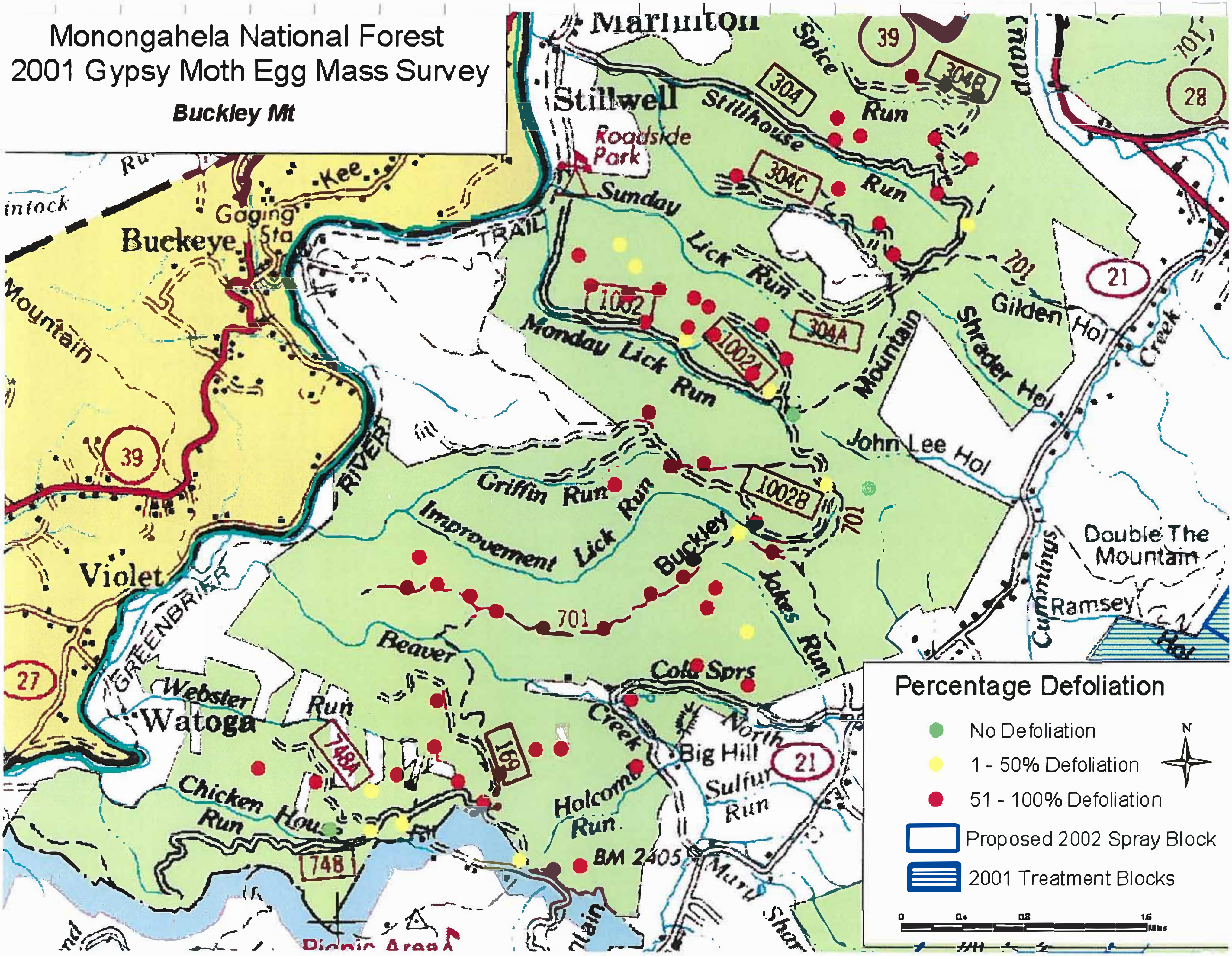
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Brushy Mt South


Brushy Mt South
Middle Knob
Briery Knob
3409
Knob
Schoolhouse
Hol
Douthat
Brushy
Wade
Hol
Holcomb Run
Sulfur
Run
BM 2405
Mutt
Sharp Run
Mountain
Buzzard Hol
Devils Garden
Kline
Hollow
Shelter
Lost
TRAILHE
Park
Laurel
Campground
Landing Strip
The Dock
Creek
169
23
21
343
965
962
608
701
310
310A
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles

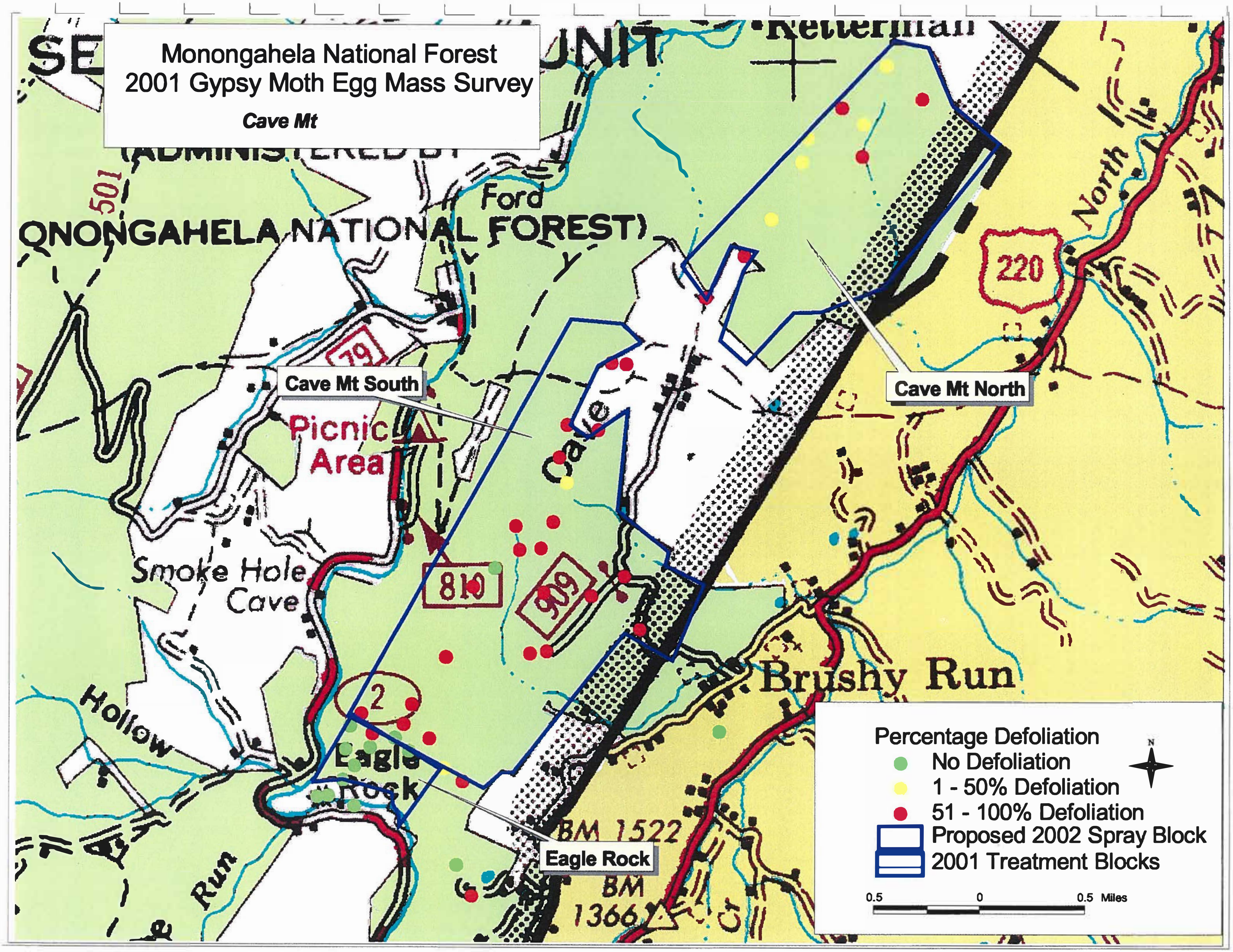
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Buckley Mt


Marlinton
Stillwell
Roadside Park
Spice Run
Stillhouse Run
Sunday Lick Run
Monday Lick Run
Gilden Hol
Shrader Hol
John Lee Hol
Mountain
Griffin Run
Improvement Lick Run
Buckley
Jakes Run
Beaver
Cold Sprs
Creek
North
Big Hill
Sulfur Run
Holcomb Run
BM 2405
Webster
Run
Watoga
Chicken House Run
Picnic Area
GREENBRIER RIVER
TRAIL
Buckeye
Gaging Sta
Kee
Mountain
Violet
Double The Mountain
Ramsey
Cummings
Creek
39
28
21
27
304
304B
304C
304A
1002
1002A
10028
701
748A
169
748
Percentage Defoliation
No Defoliation
1 - 50% Defoliation
51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0
0.4
0.8
1.6
Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

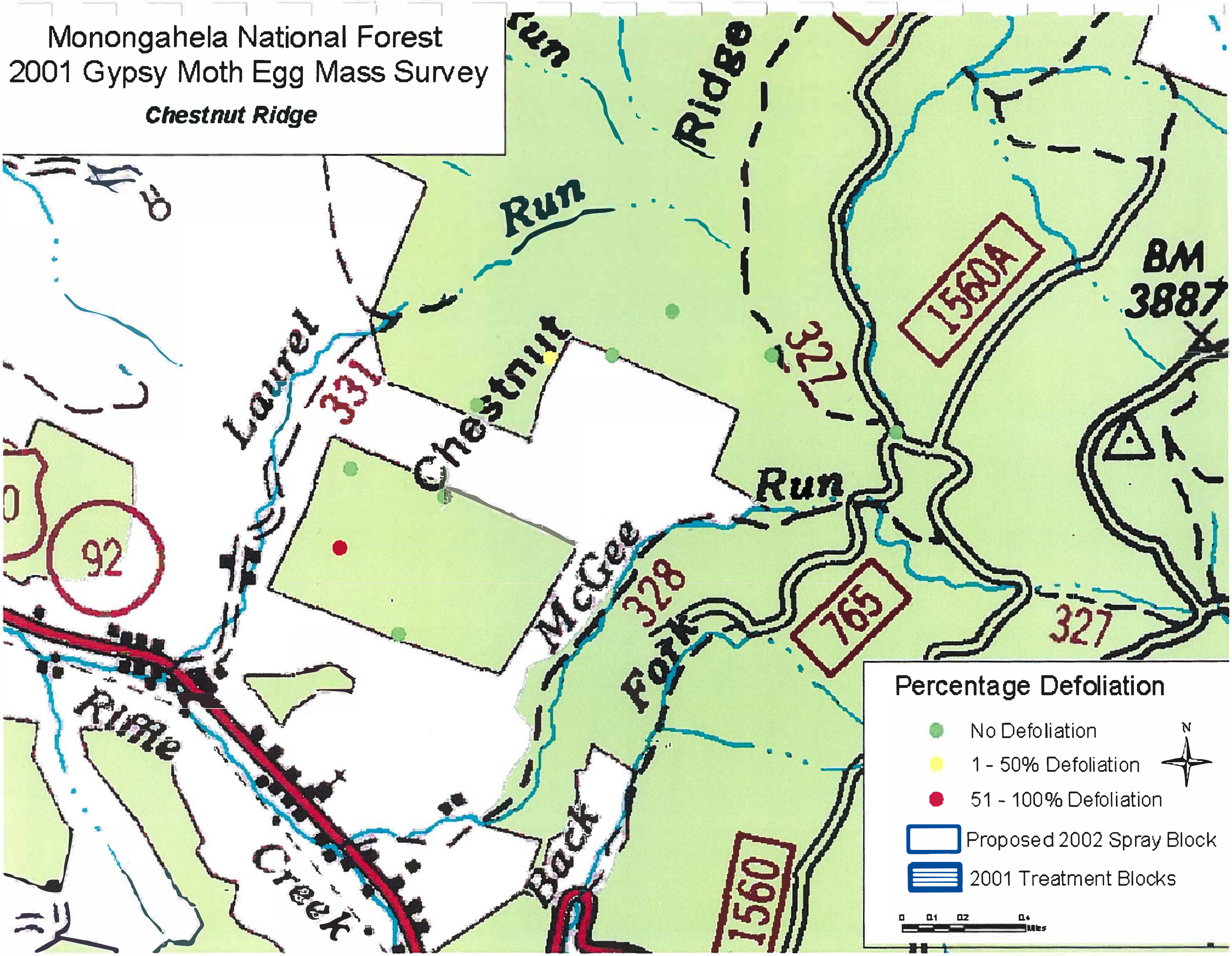
Cave Mt



SE
UNIT
Ketterman
(ADMINISTERED BY
501
Ford
MONONGAHELA NATIONAL FOREST)
79
Cave Mt South
Picnic Area
Cave Mt North
220
North
Cave
Smoke Hole Cave
810
909
2
Hollow
Eagle Rock
Run
Brushy Run
BM 1522
BM 1366
Cr
Eagle Rock
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles

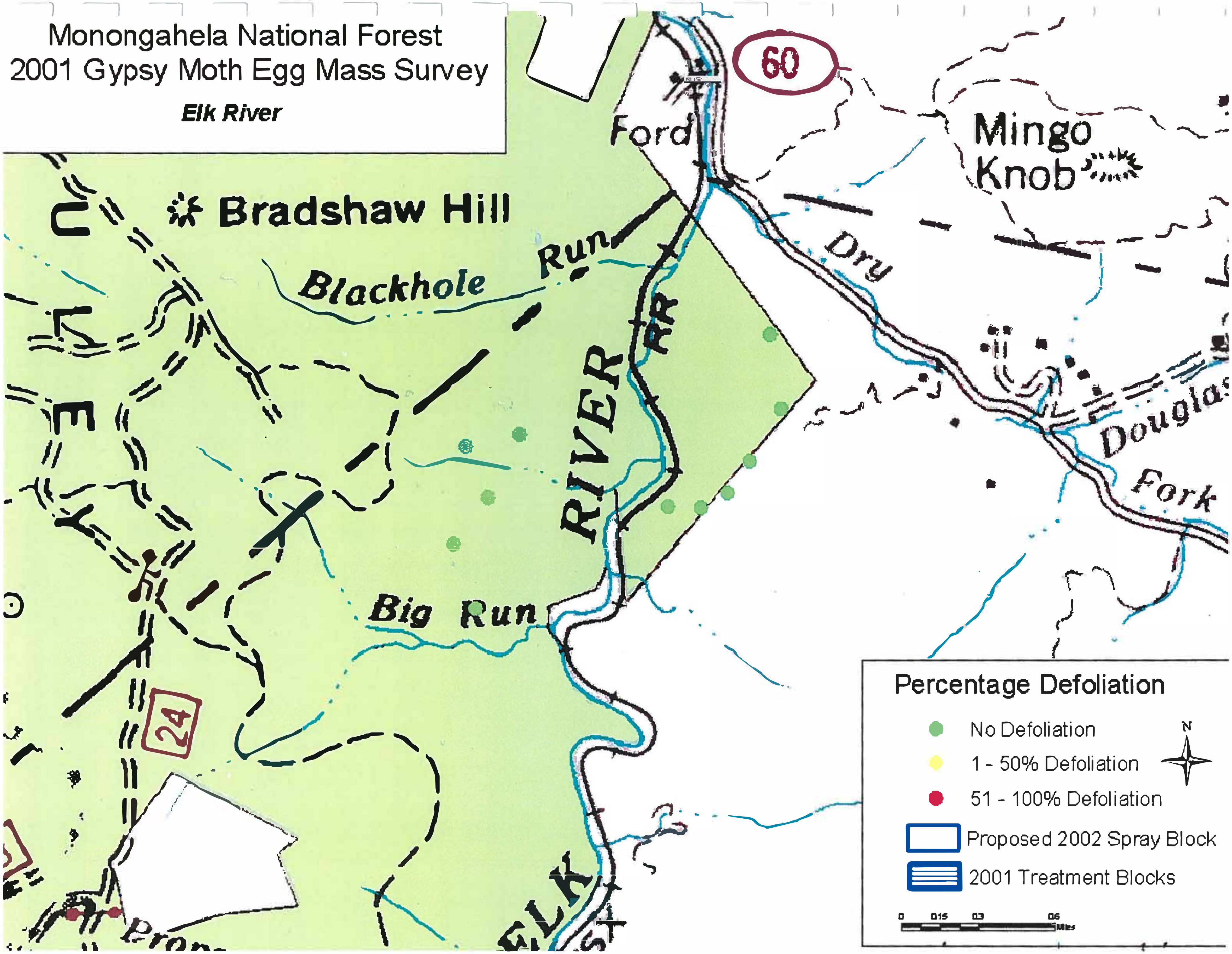
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Chestnut Ridge


Run
Ridge
Run
Laurel
331
Chestnut
Chestnut
327
1560A
BM
3887
Run
McGee
328
765
327
Fork
92
Rifle
Creek
Back
1560
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
☐ Proposed 2002 Spray Block
▤ 2001 Treatment Blocks
N
0
0.1
0.2
0.4
Miles

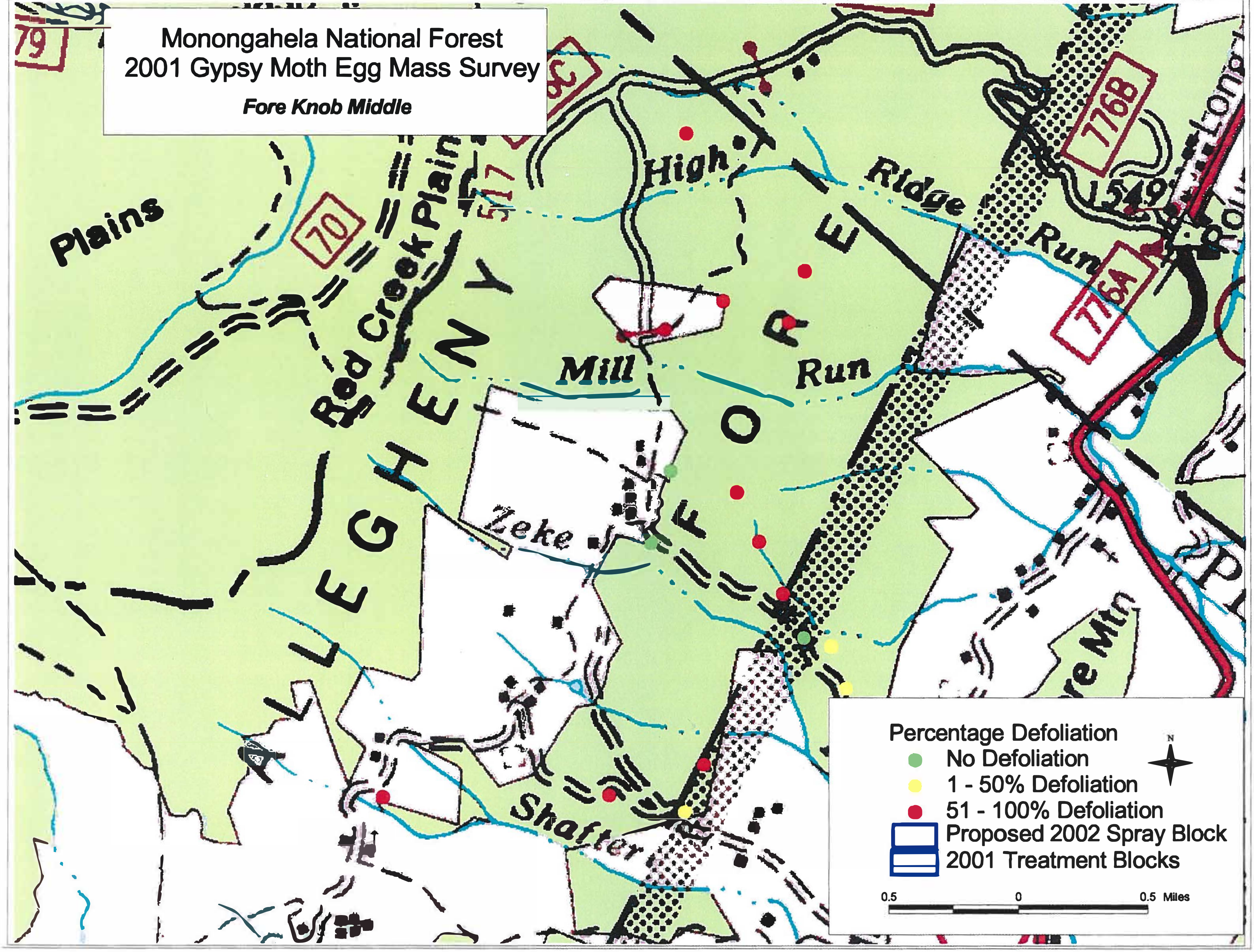
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Elk River


Ford
Mingo Knob
Bradshaw Hill
Blackhole Run
Dry
RR
RIVER
Douglas
Fork
Big Run
24
ELK
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0
0.15
0.3
0.6
Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Fore Knob Middle

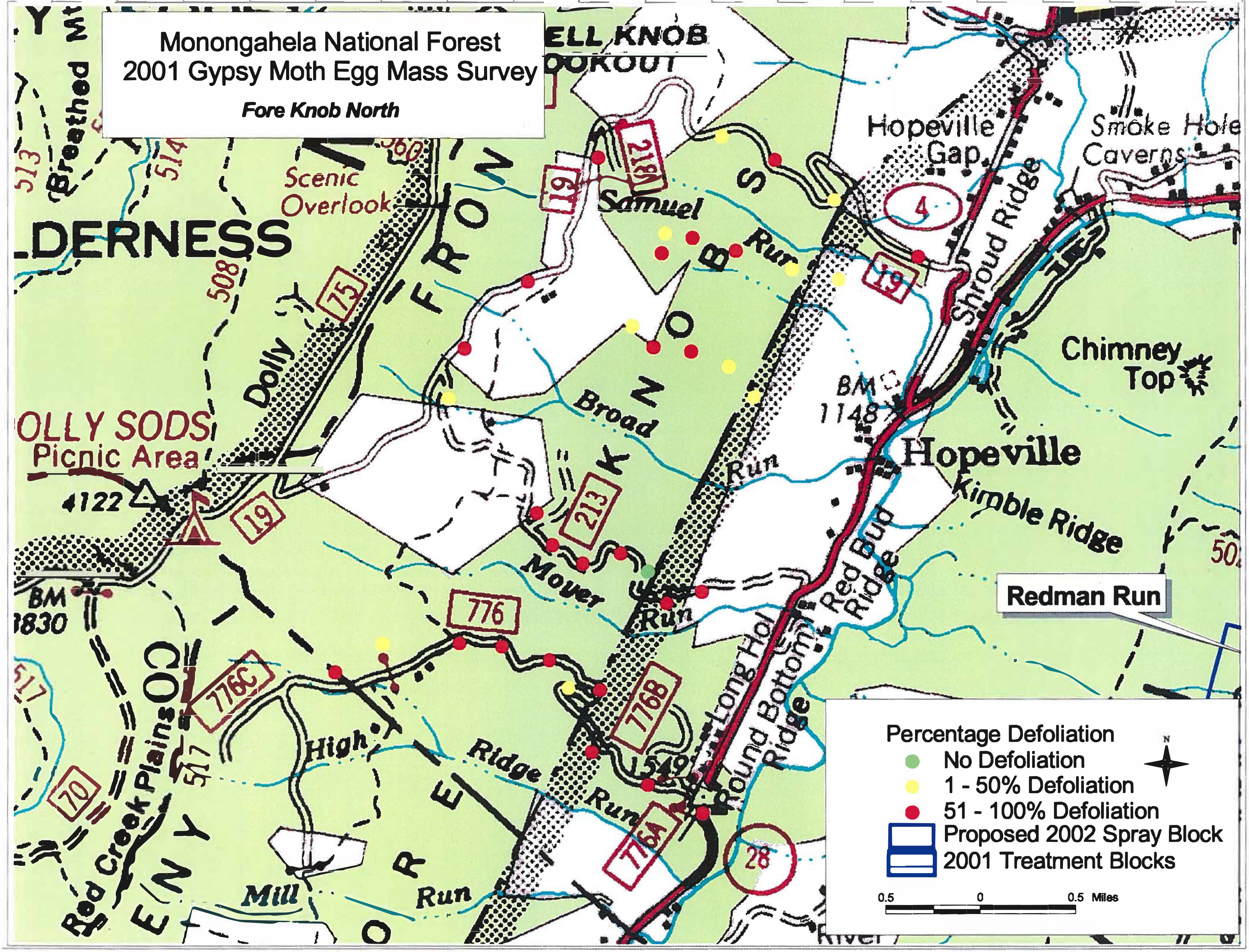


Plains
Red Creek Plains
70
517
79
High
Ridge
Run
Mill
Run
Zeke
Shafter
776B
776A
1549
ALLEGHENY FORE
Mtn
N
0.5
0
0.5 Miles

Percentage Defoliation
- ● No Defoliation
- ● 1 - 50% Defoliation
- ● 51 - 100% Defoliation
- ☐ Proposed 2002 Spray Block
- ☐ 2001 Treatment Blocks

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

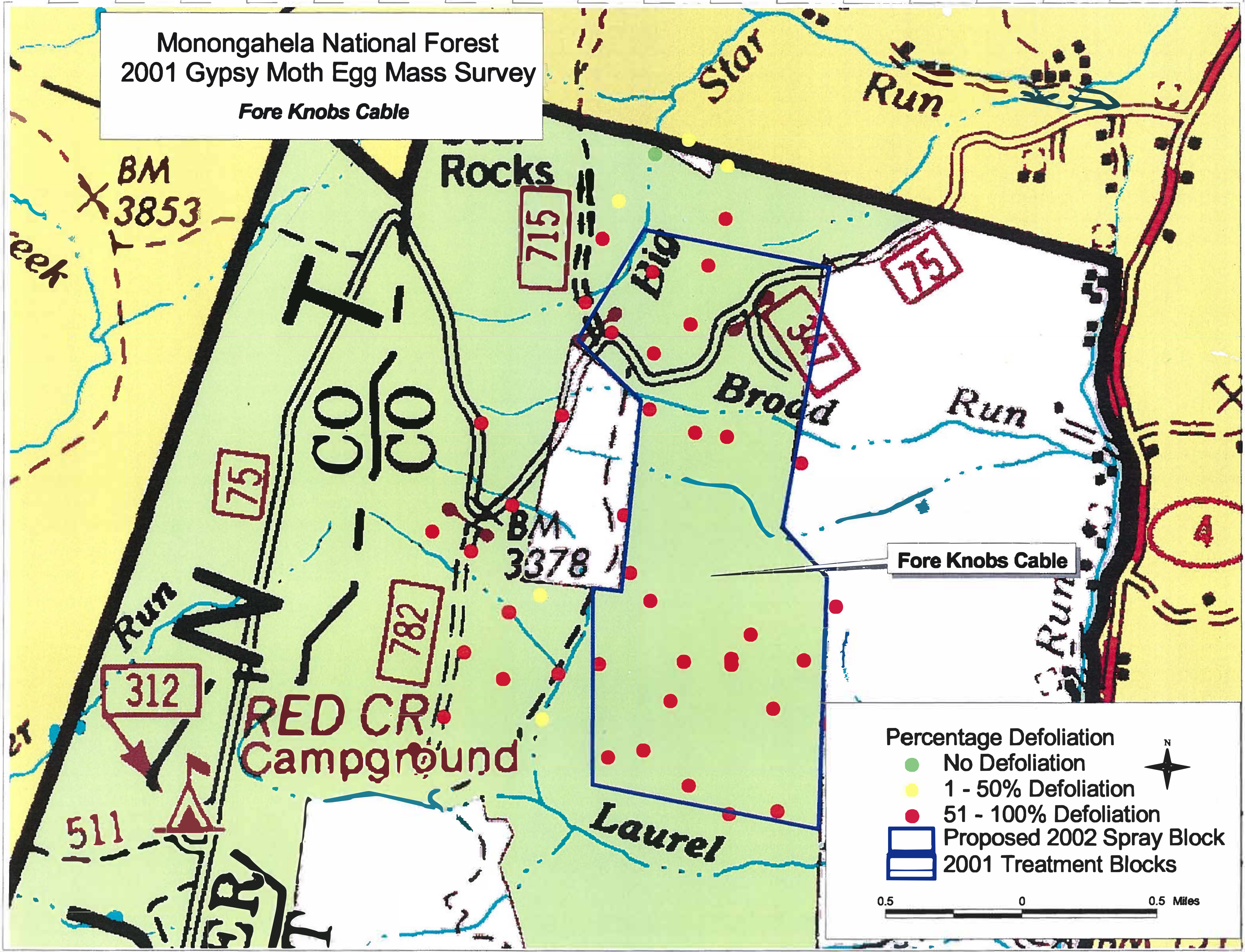
Fore Knob North



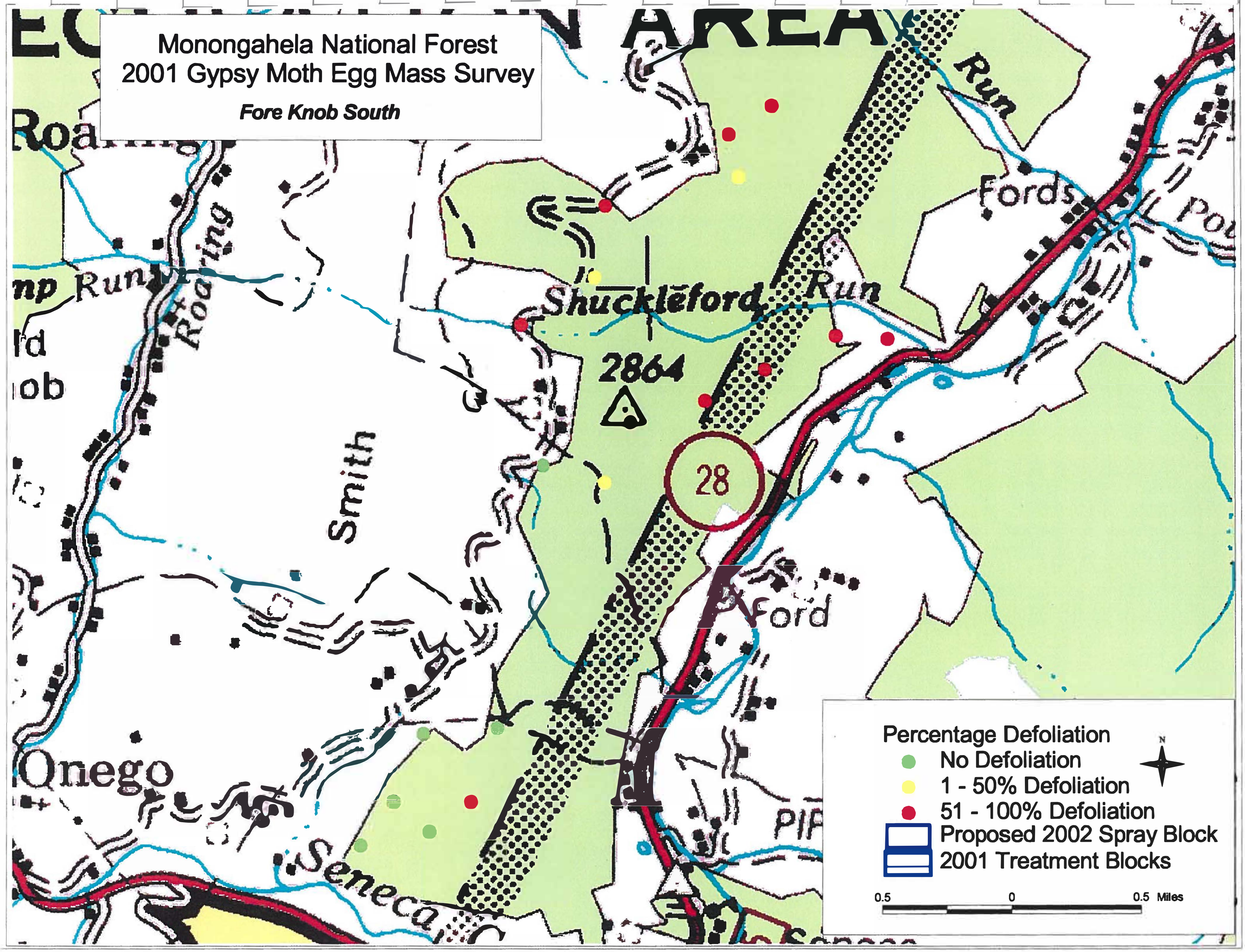
ELL KNOB
OOKOUT
Breathed Mt
Scenic Overlook
LDERNESS
OLLY SODS
Picnic Area
4122
Dolly
FRONT
KNOBS
Samuel Run
Broad Run
Mower Run
High Ridge Run
Mill Run
Red Creek Plains
Hopeville Gap
Smoke Hole Caverns
Shroud Ridge
Chimney Top
BM 1148
Hopeville
Kimble Ridge
Red Bud Ridge
Long Hol
Round Bottom Ridge
Redman Run
BM 3830
1549
River
513
514
560
508
75
19
212
213
4
776
776B
776C
776A
517
70
28
50
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
☐ Proposed 2002 Spray Block
☐ 2001 Treatment Blocks
N
0.5
0
0.5 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Fore Knobs Cable

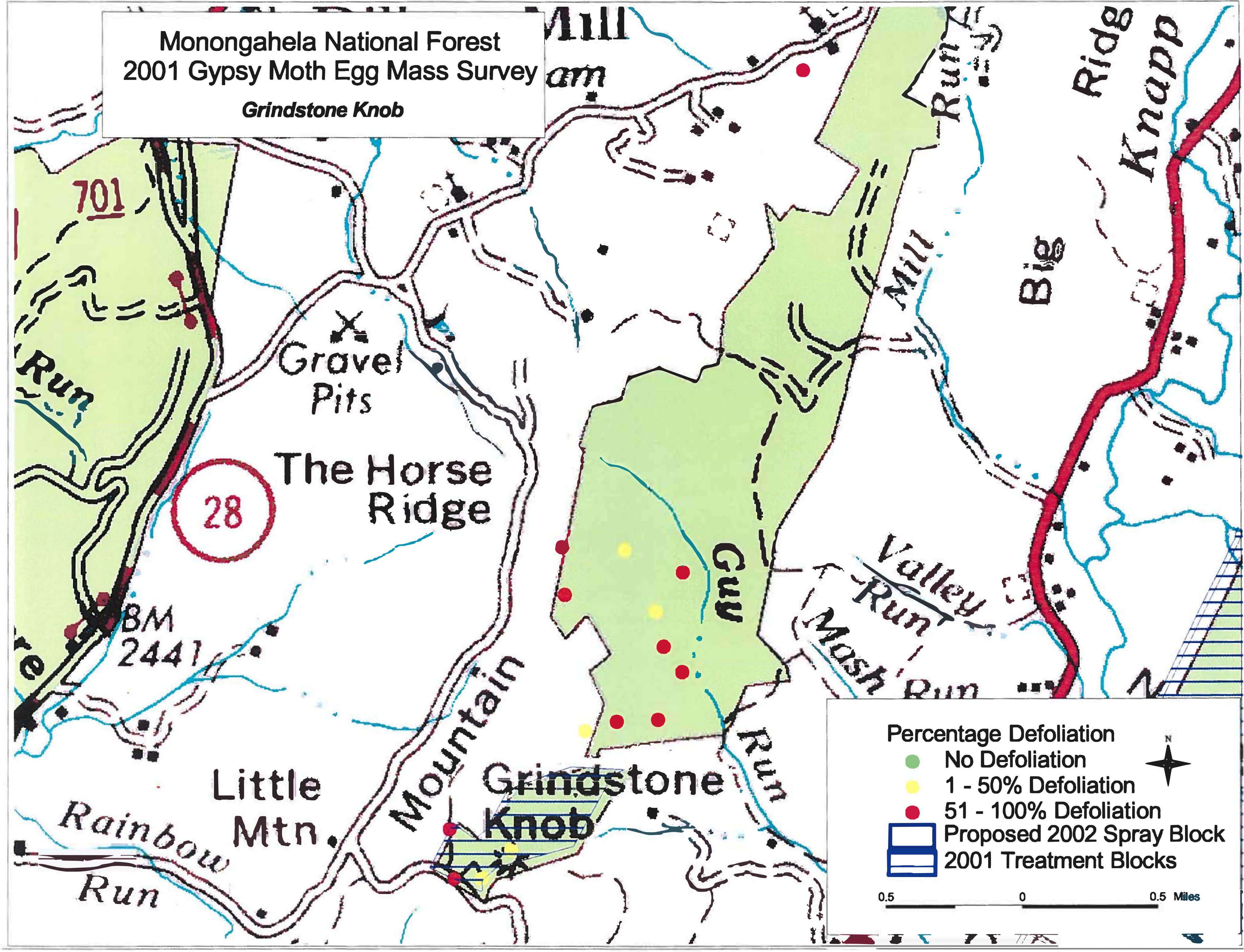

Star
Run
Rocks
715
BM
3853
eek
Big
75
347
Broad
Run
CO
CO
BM
3378
Fore Knobs Cable
4
Run
Run
782
312
RED CR
Campground
511
Laurel
Percentage Defoliation
No Defoliation
1 - 50% Defoliation
51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey
Fore Knob South


AREA
Roaring
Run
Roaring
Smith
Shuckleford
Run
2864
28
Fords
Ford
Run
Onego
Seneca
PIP
Percentage Defoliation
No Defoliation
1 - 50% Defoliation
51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles

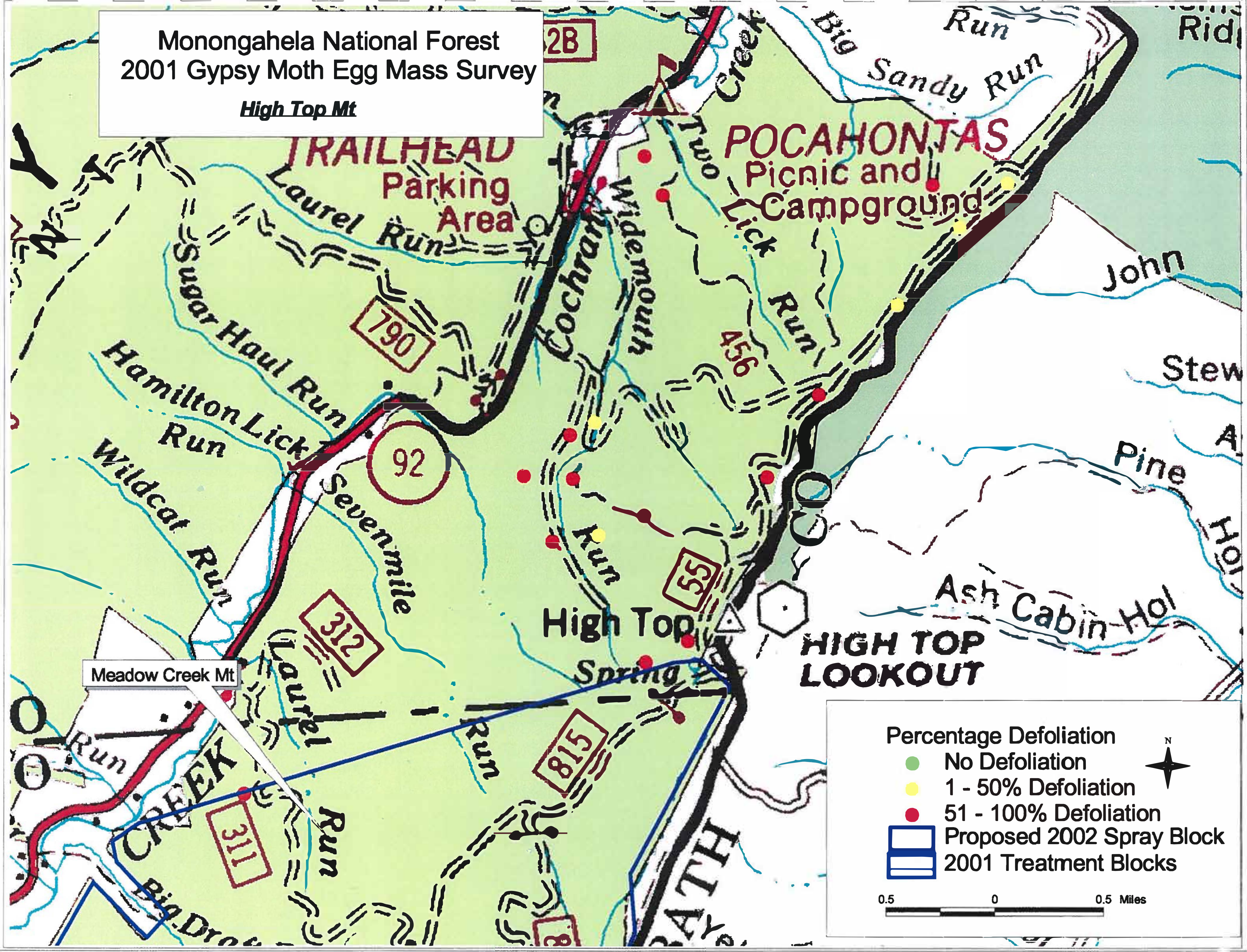
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

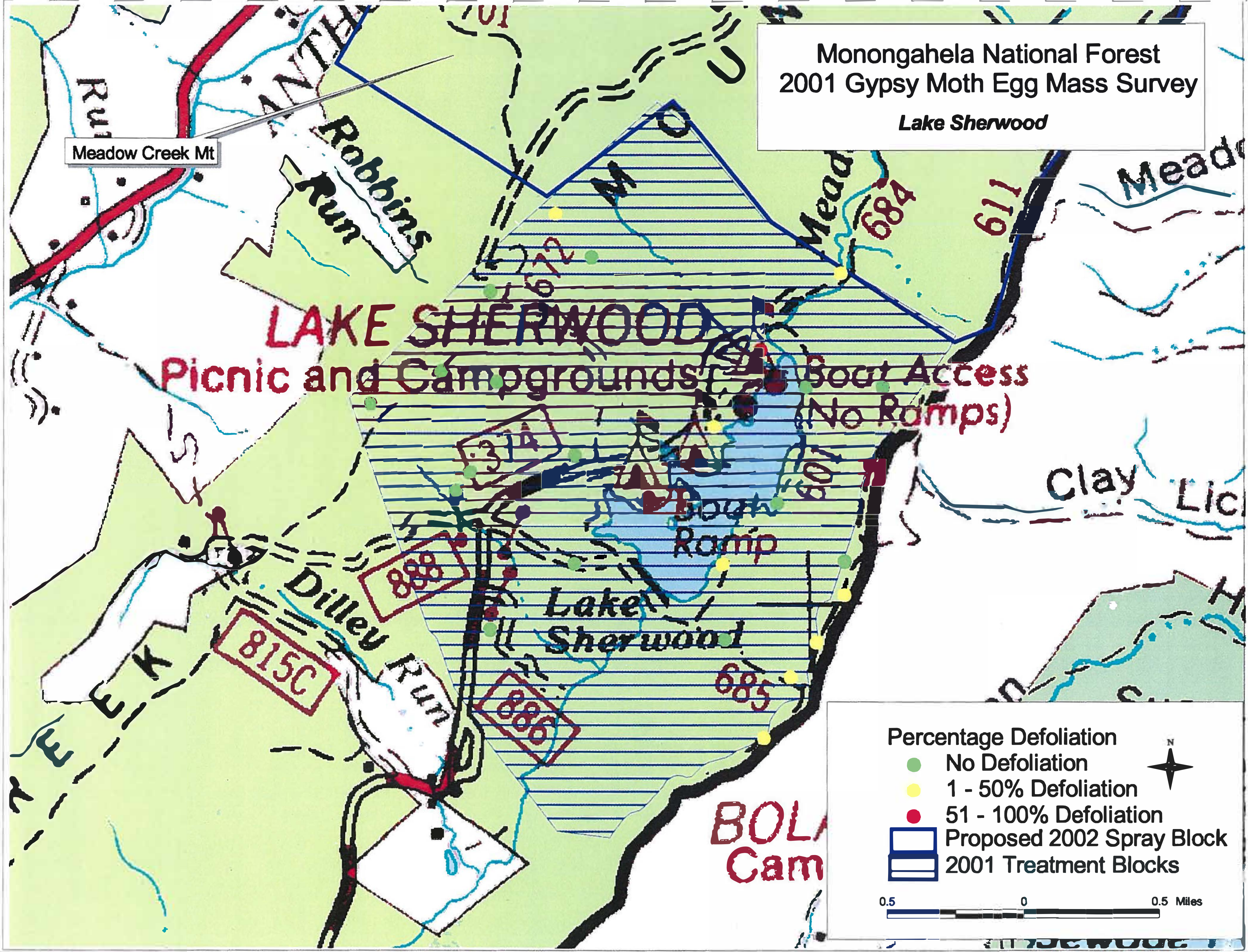
Grindstone Knob


Mill
am
701
Run
Gravel
Pits
The Horse
Ridge
28
BM
2441
Little
Mtn
Rainbow
Run
Mountain
Grindstone
Knob
Guy
Run
Mill
Run
Big
Ridg
Knapp
Valley
Run
Mash
Run
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

High Top Mt


TRAILHEAD Parking Area
POCAHONTAS Picnic and Campground
Big Sandy Run
Two Lick Run
Laurel Run
Sugar Haul Run
Hamilton Lick Run
Wildcat Run
Sevenmile
Cochran
Widemouth
Run
Laurel Run
Spring
Big Draft
CREEK
John
Stew
Pine
Ash Cabin Hol
High Top
HIGH TOP LOOKOUT
Meadow Creek Mt
790
92
456
55
312
311
815
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
☐ Proposed 2002 Spray Block
☐ 2001 Treatment Blocks
N
0.5
0
0.5 Miles



Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Lake Sherwood

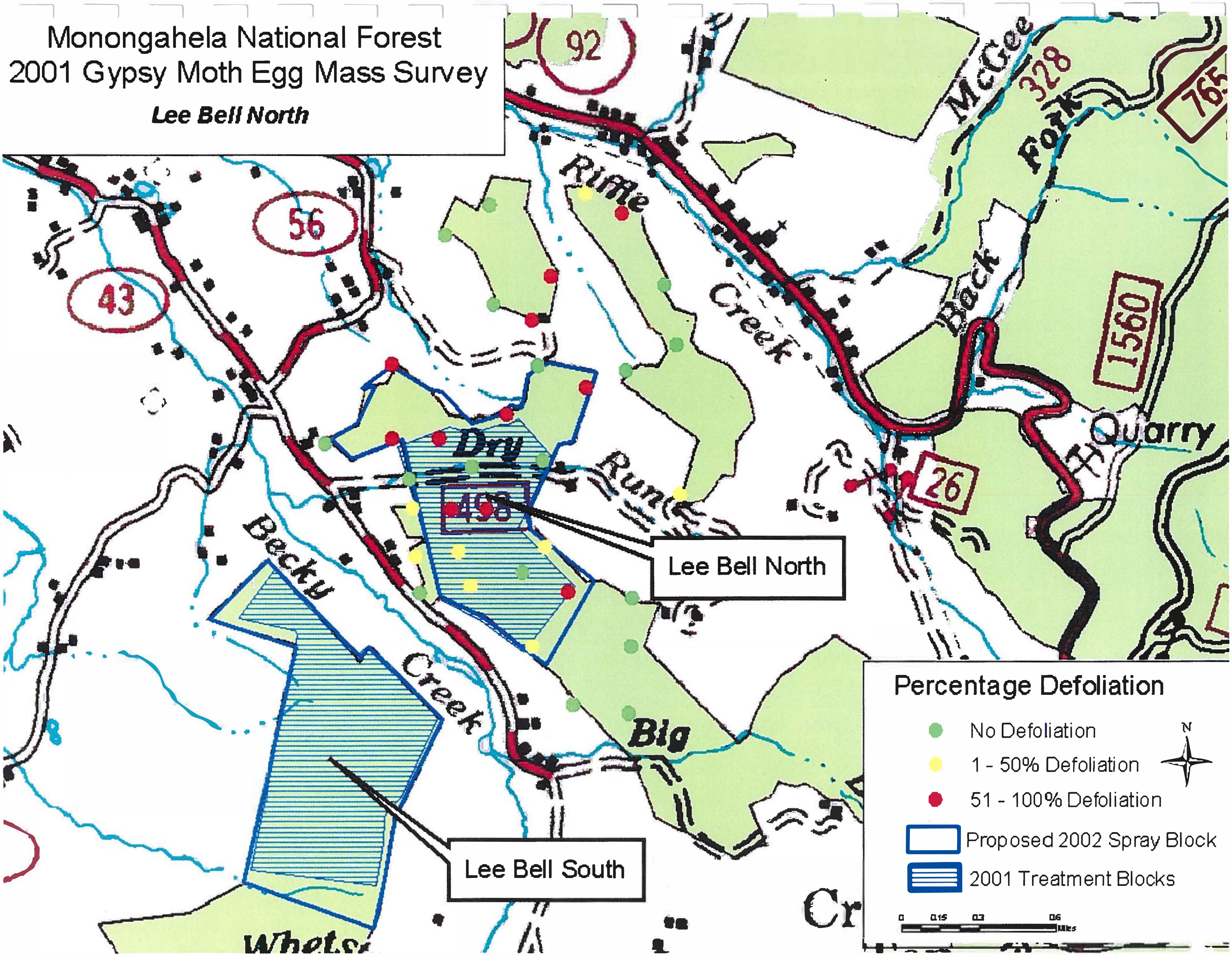
Percentage Defoliation

- ● No Defoliation
- ● 1 - 50% Defoliation
- ● 51 - 100% Defoliation
- ☐ Proposed 2002 Spray Block
- ▤ 2001 Treatment Blocks

Meadow Creek Mt
Robbins Run
LAKE SHERWOOD
Picnic and Campgrounds
Boat Access
(No Ramps)
Boat Ramp
Lake Sherwood
Dilley Run
Clay Lick
Mead
Meado
612
684
611
607
314
888
815C
886
685
701
BOL
Cam
N
0.5
0
0.5 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

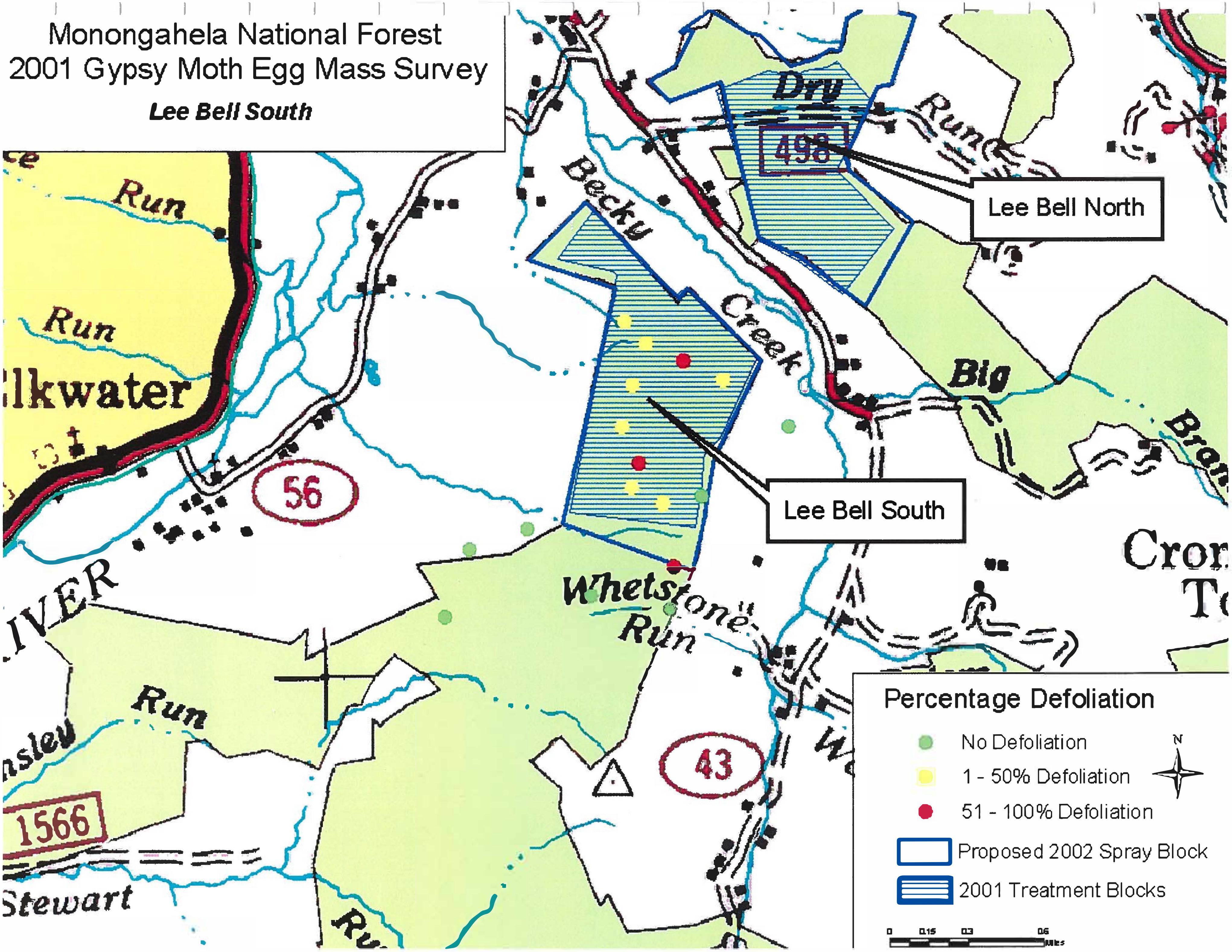
Lee Bell North



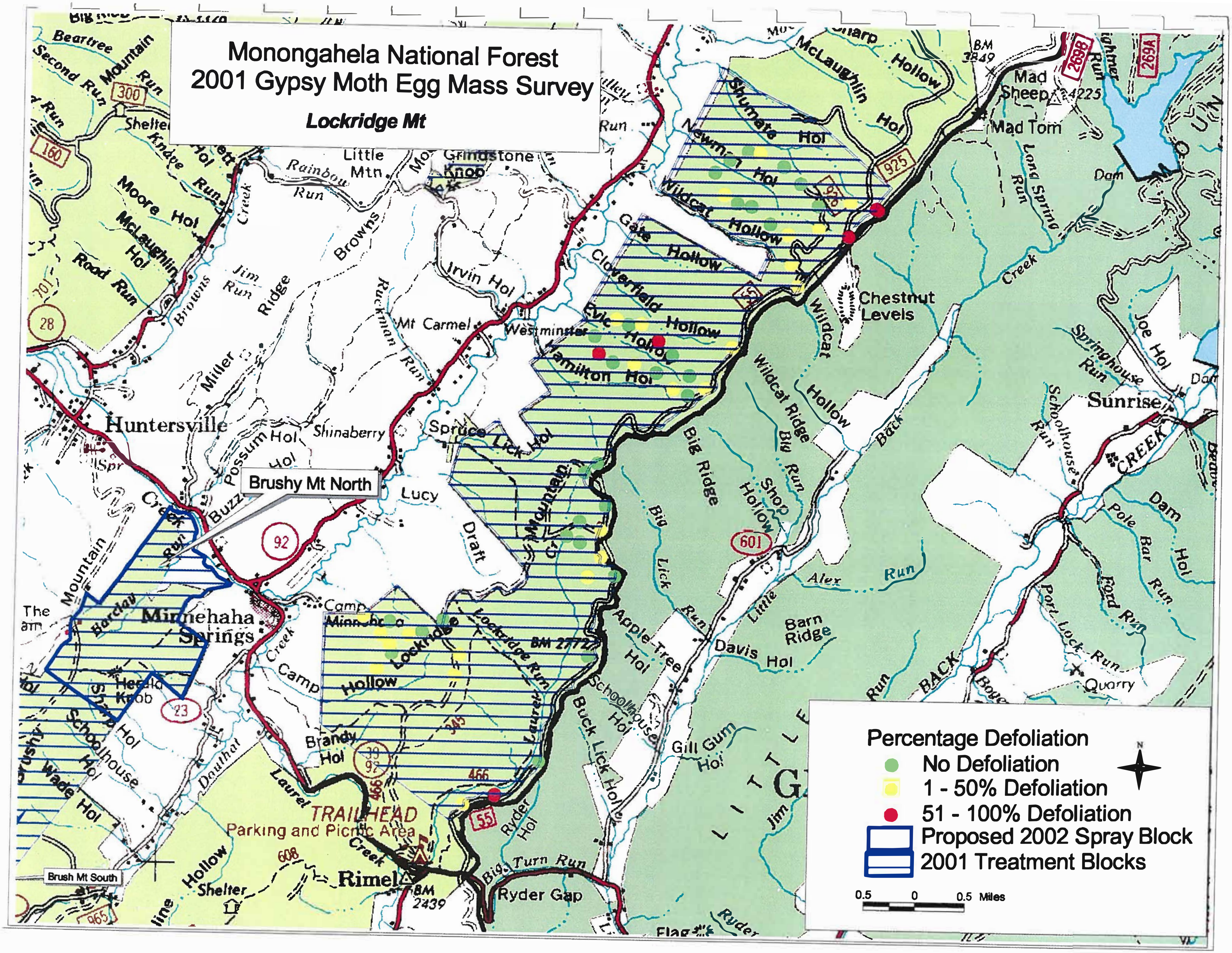
92
56
43
McGee
328
765
Fork
Riffle
Creek
Back
1560
Dry
498
Run
26
Quarry
Lee Bell North
Becky
Creek
Big
Lee Bell South
Whets
Cr
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
▭ Proposed 2002 Spray Block
▤ 2001 Treatment Blocks
N
0
0.15
0.3
0.6
Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Lee Bell South



Dry
Run
498
Lee Bell North
Becky
Creek
Big
Bran
Run
Run
lkwater
56
Lee Bell South
Cror
Tc
IVER
Whetstone
Run
Run
nsley
1566
Stewart
Ru
43
We
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
▭ Proposed 2002 Spray Block
▤ 2001 Treatment Blocks
N
0
0.15
0.3
0.6
Miles



Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Lockridge Mt

Percentage Defoliation

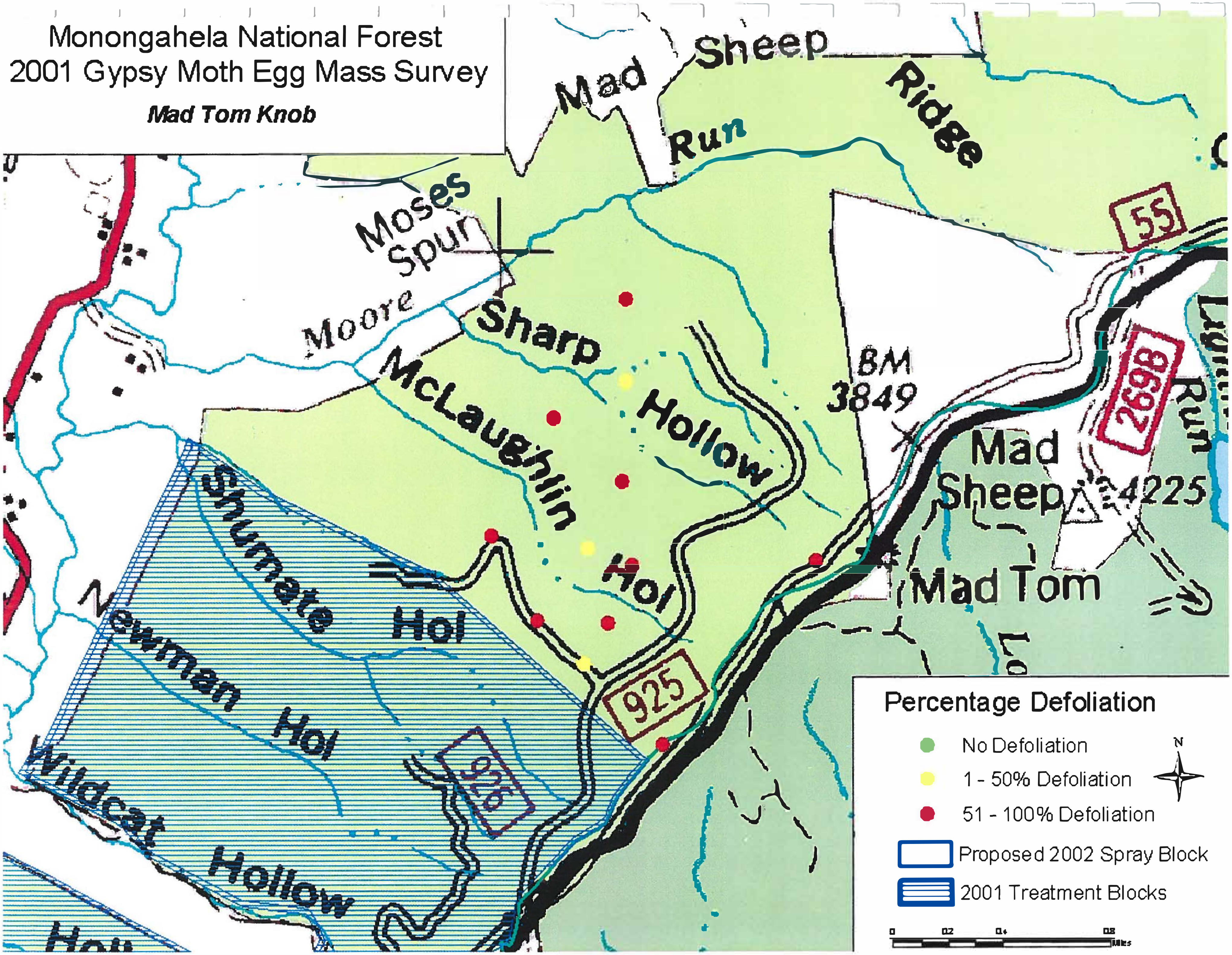
- ● No Defoliation
- ● 1 - 50% Defoliation
- ● 51 - 100% Defoliation
- ☐ Proposed 2002 Spray Block
- ▤ 2001 Treatment Blocks

0.5 0 0.5 Miles

N
Brushy Mt North
Brush Mt South
Beartree
Second Run
Mountain
Run
Shelter
Knobe
Hol
Moore Hol
McLaughlin Hol
Road Run
Browns
Jim Run
Ridge
Miller
Little Mtn
Rainbow Run
Grindstone Knob
Browns
Irvin Hol
Mt Carmel
Ruckman Run
Westminster
Huntersville
Possum Hol
Shinaberry
Spruce
Lick Hol
Lucy
Draft
Mountain
Buzz Run
Creek
Minnehaha Springs
Barclay
Heald Knob
Camp Minnehaha
Lockridge
Hollow
Camp Creek
Lockridge Run
BM 2772
Brandy Hol
Laurel Creek
TRAILHEAD
Parking and Picnic Area
Rimel
BM 2439
Shelter
Hollow
Schoolhouse Hol
Wade Hol
Brushy
Douthat
Ryder Hol
Big Turn Run
Ryder Gap
Buck Lick Hol
Schoolhouse Hol
Gill Gum Hol
Apple Tree Hol
Davis Hol
Barn Ridge
Little
Alex Run
Big Lick Run
Big Ridge
Shop Hollow
Big Run
Wildcat Ridge
Wildcat Hollow
Chestnut Levels
Back Creek
Creek
Long Spring Run
Mad Tom
Mad Sheep 4225
BM 3849
McLaughlin Hol
Sharp Hollow
Shumate Hol
Newman Hol
Wildcat Hollow
Gate Hollow
Cloverfield Hollow
Evic Hollow
Hamilton Hol
Dam
Joe Hol
Springhouse Run
Sunrise
Schoolhouse Run
CREEK
Pole Bar Hol
Dam Run
Ford Run
Port Lock Run
Quarry
BACK
Run
Flag
Ryder
Jim
300
160
28
701
92
23
39
97
466
345
608
965
55
601
925
269B
269A

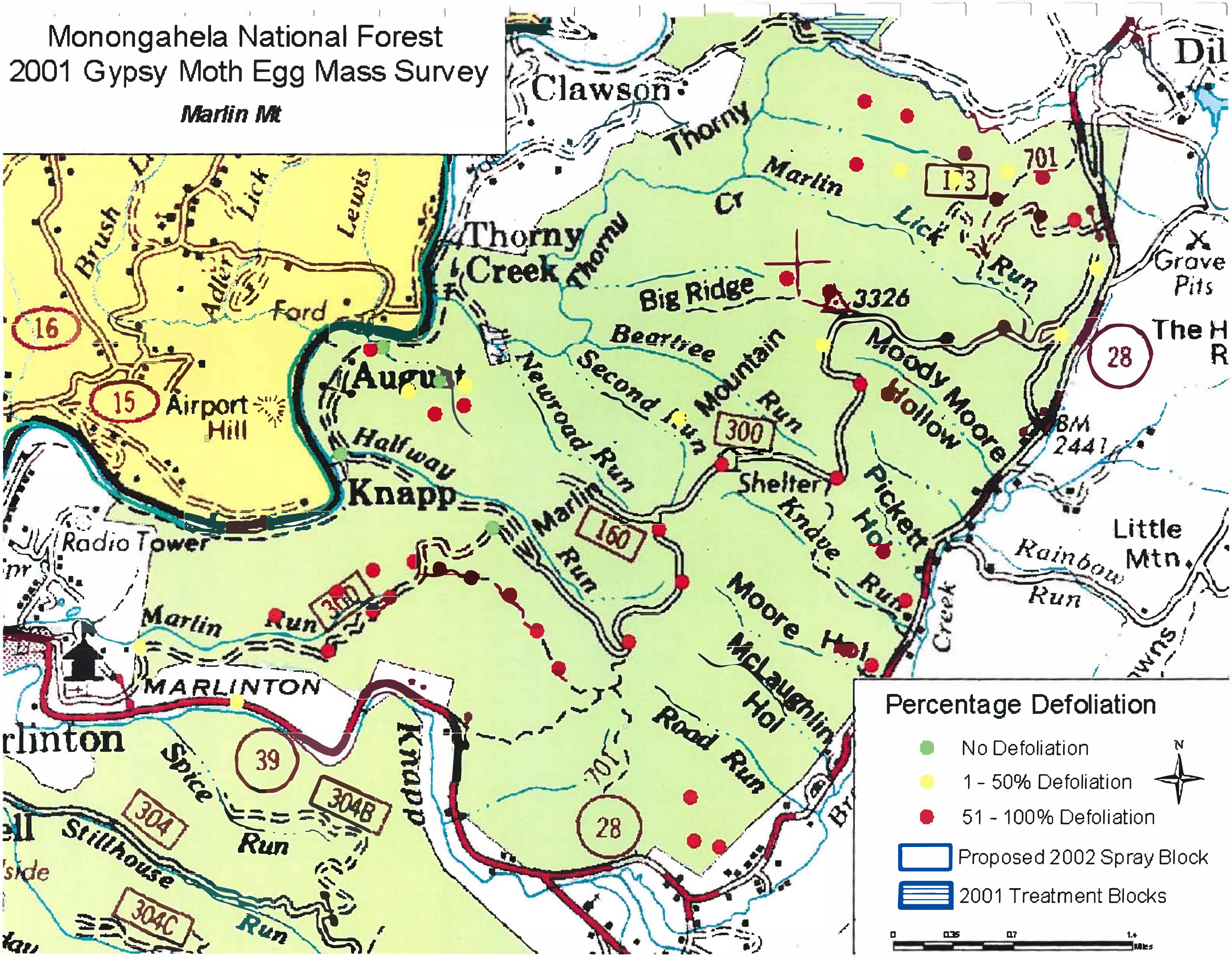
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Mad Tom Knob


Mad Sheep Run
Ridge
Moses Spur
Moore
Sharp Hollow
McLaughlin Hol
Shumate Hol
Newman Hol
Wildcat Hollow
Holl
55
2698
925
926
BM 3849
Mad Sheep 4225
Mad Tom
Run
Lo
Percentage Defoliation
No Defoliation
1 - 50% Defoliation
51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0
0.2
0.4
0.8
Miles

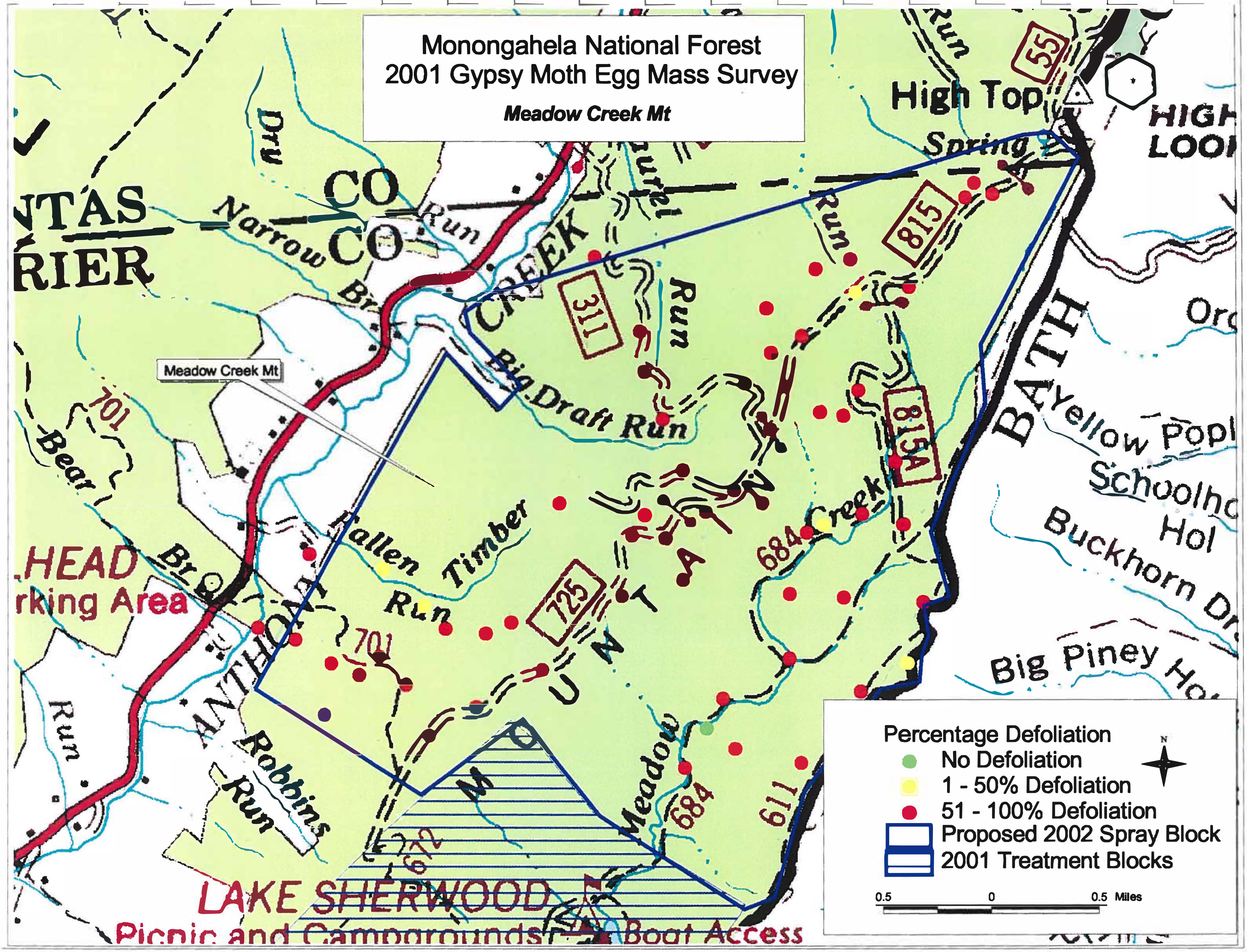
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Marlin Mt


Clawson
Dil
Thorny
Marlin
Cr
Lick
Run
173
701
Grove Pits
The H
R
28
Big Ridge
3326
Beartree
Mountain
Moody Moore
Hollow
Run
300
BM 2441
Thorny Creek
Thorny
Brush
Lick
Lewis
Adler
Ford
16
15
Airport Hill
August
Newroad Run
Second Run
Halfway
Knapp
Marlin Run
160
Shelter
Knave Run
Pickett Hol
Little Mtn.
Rainbow Run
Creek
Radio Tower
Marlin Run
301
MARLINTON
Moore Hol
McLaughlin Hol
Road Run
Marlinton
Spice Run
39
Knapp
701
28
304
304B
304C
Stillhouse Run
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
☐ Proposed 2002 Spray Block
▤ 2001 Treatment Blocks
N
0
0.35
0.7
1.4
Miles

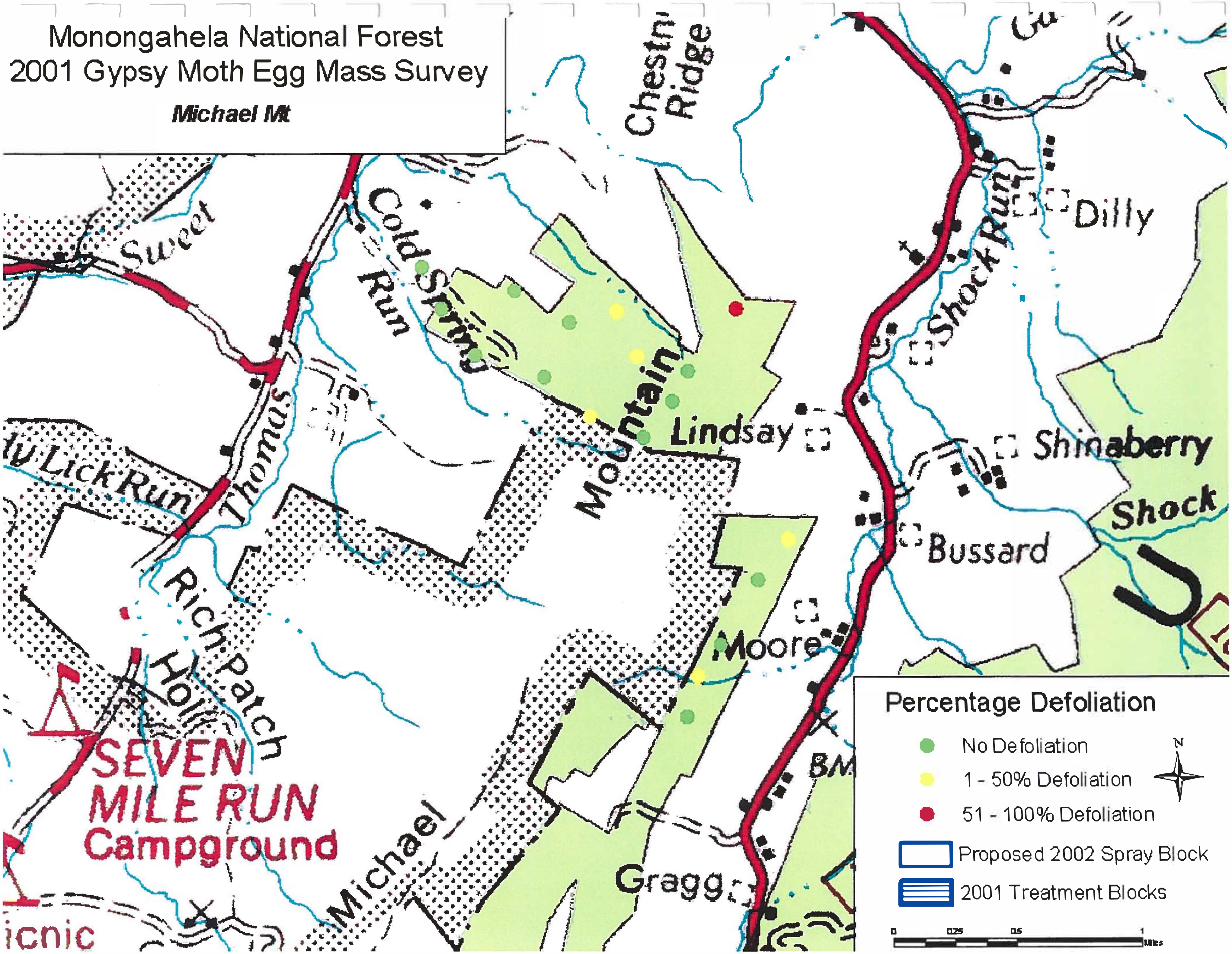
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Meadow Creek Mt


High Top
55
HIGH
LOO
Spring
815
Run
Dry
Narrow
Run
CO
CO
NTAS
RIER
Br
CREEK
311
Run
Big Draft Run
Meadow Creek Mt
701
Bear
BATH
Yellow Popl
Schoolh
Hol
Buckhorn Dr
Big Piney Ho
Orc
815A
684 Creek
Fallen Timber Run
725
ANTHONY
MOUNTAIN
HEAD
rking Area
Br
Run
Robbins Run
701
672
Meadow
684
611
LAKE SHERWOOD
Picnic and Campgrounds
Boat Access
Percentage Defoliation
No Defoliation
1 - 50% Defoliation
51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles

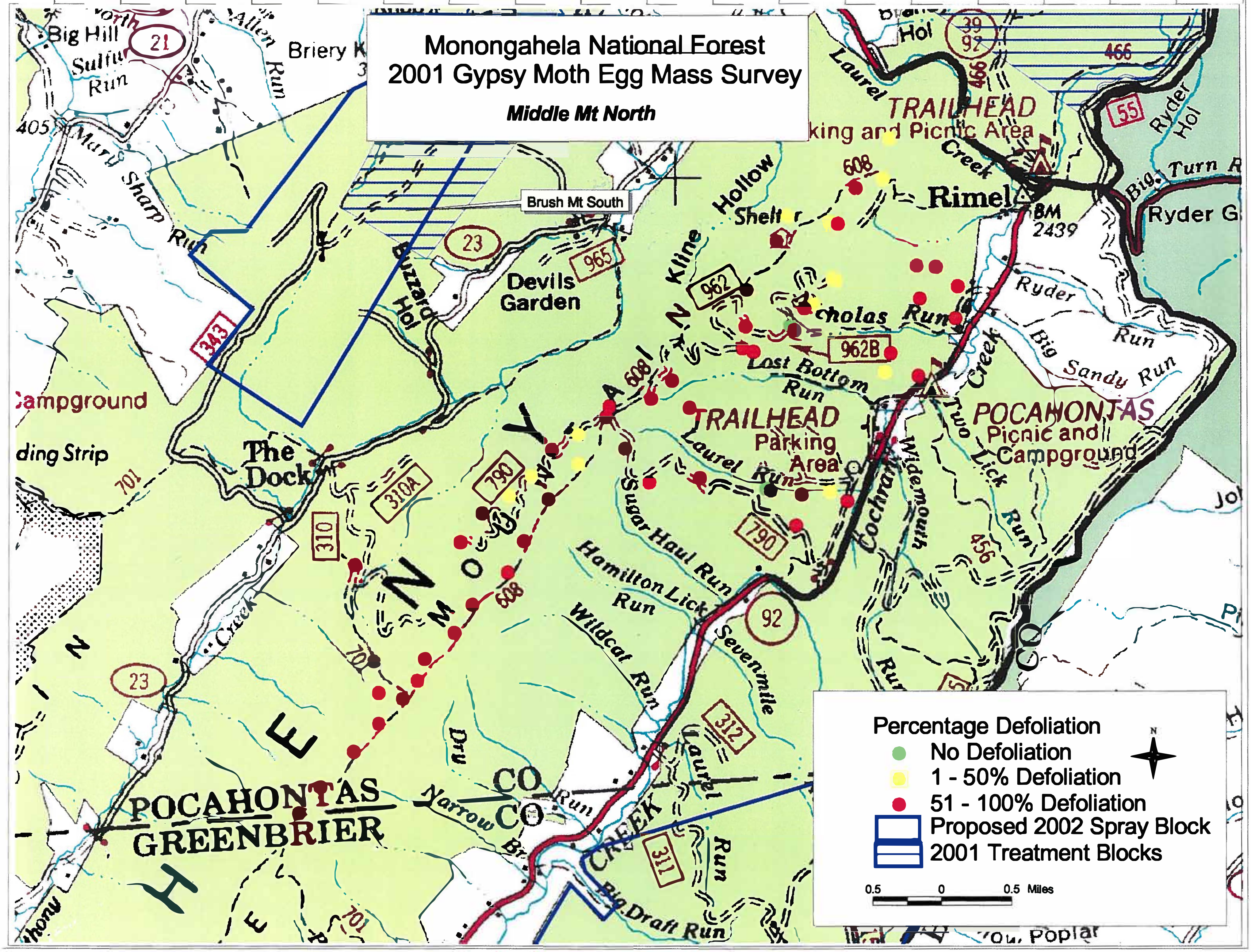
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Michael Mt


Chestnut Ridge
Dilly
Shock Run
Cold Spring Run
Sweet
Mountain
Lindsay
Shinaberry
Shock
Bussard
Moore
Thomas
Lick Run
Rich Patch Holl
SEVEN MILE RUN Campground
Michael
Gragg
BM
icnic
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0
0.25
0.5
1
Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Middle Mt North

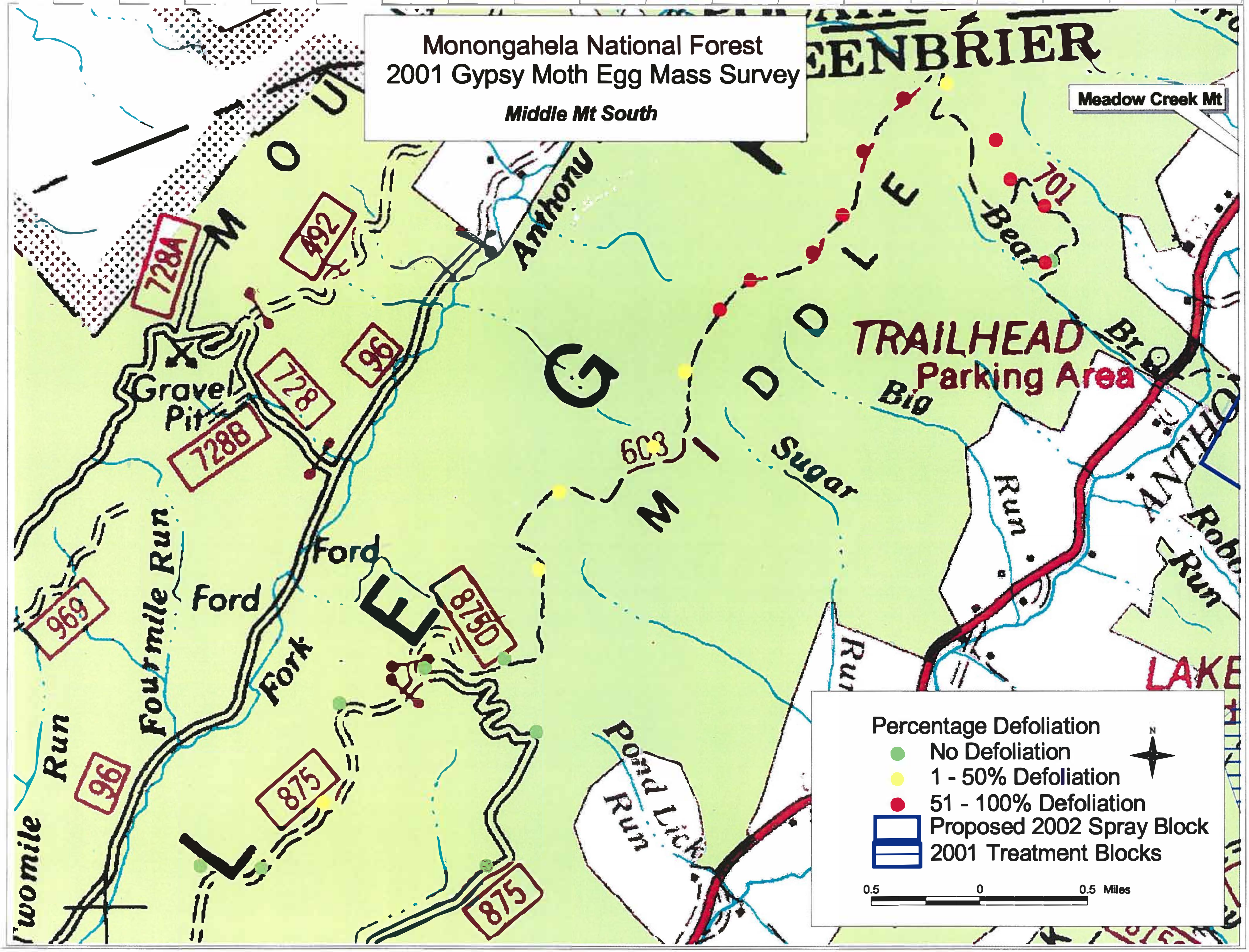

Brush Mt South
Big Hill
Sulfur Run
Allen Run
Briery K
Mary Sharp Run
Devils Garden
Buzzard Hol
The Dock
Campground
Landing Strip
Hollow
Shelter
Kline
Laurel
TRAILHEAD
Parking and Picnic Area
Creek
Rimel
BM 2439
Ryder G
Big Turn
Ryder Hol
Ryder Run
Big Sandy Run
Nicholas Run
Lost Bottom Run
TRAILHEAD
Parking Area
Laurel Run
POCAHONTAS
Picnic and Campground
Two Lick Run
Cochran
Widemouth
Sugar Haul Run
Hamilton Lick Run
Wildcat Run
Sevenmile
Laurel
Narrow
Dry
CREEK
Big Draft Run
Poplar
POCAHONTAS
GREENBRIER
MIDDLE MOUNTAIN
21
23
343
965
962
962B
608
790
310A
310
701
92
312
311
456
466
55
39
Percentage Defoliation
N
0.5
0
0.5 Miles

Percentage Defoliation

- 🟩 No Defoliation
- 🟨 1 - 50% Defoliation
- 🟥 51 - 100% Defoliation
- Proposed 2002 Spray Block
- 2001 Treatment Blocks

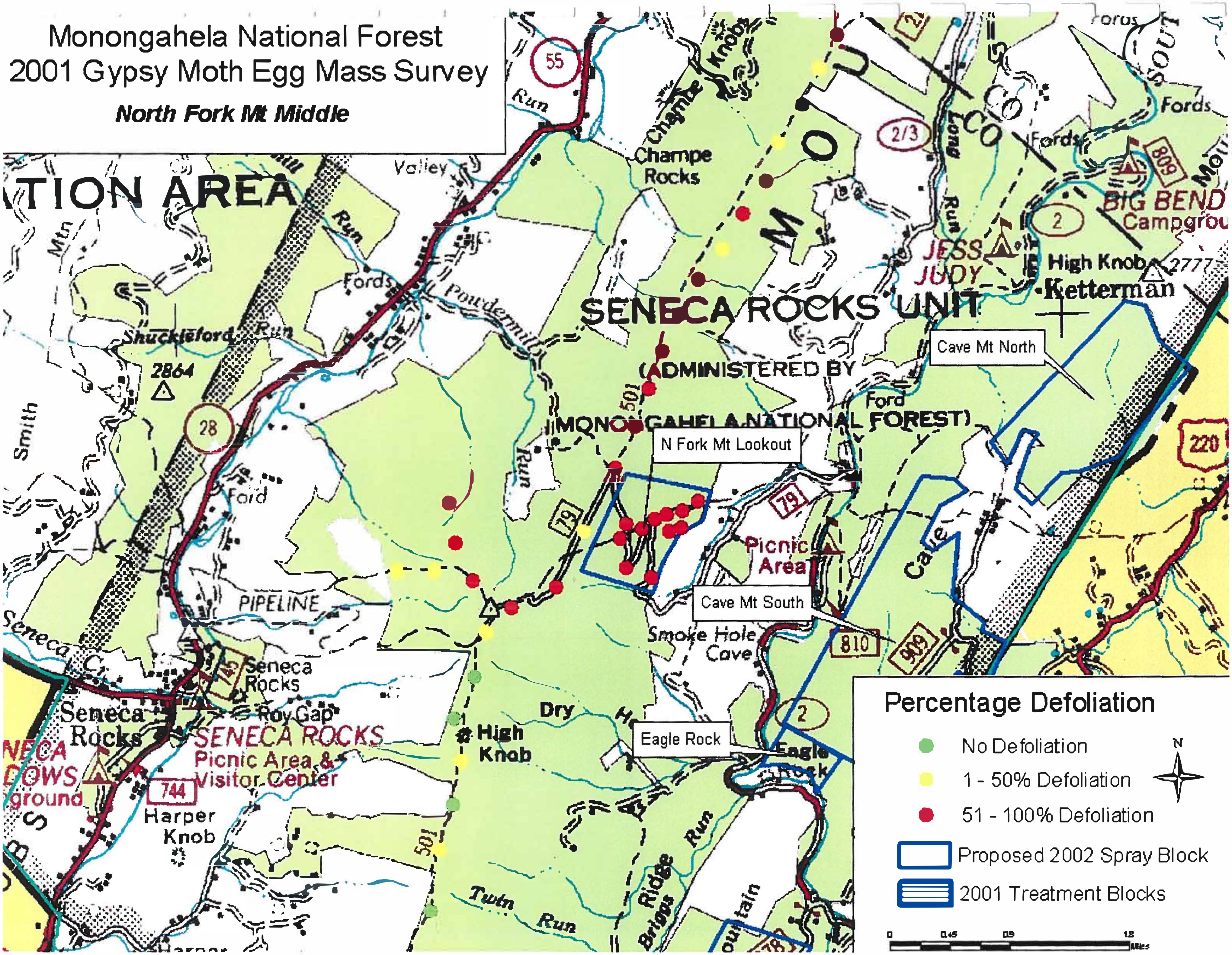
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Middle Mt South


Meadow Creek Mt
GREENBRIER
MIDDLE
MOUNTAIN
GLE
TRAILHEAD
Parking Area
Anthony
ANTHONY
Bear
Br
Big
Sugar
Run
Robbs
Run
Run
LAKE
Pond Lick
Run
Gravel
Pit
Ford
Ford
Fork
Fourmile Run
Twomile
Run
728A
492
728
96
728B
603
701
969
96
875
875
875
815D
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

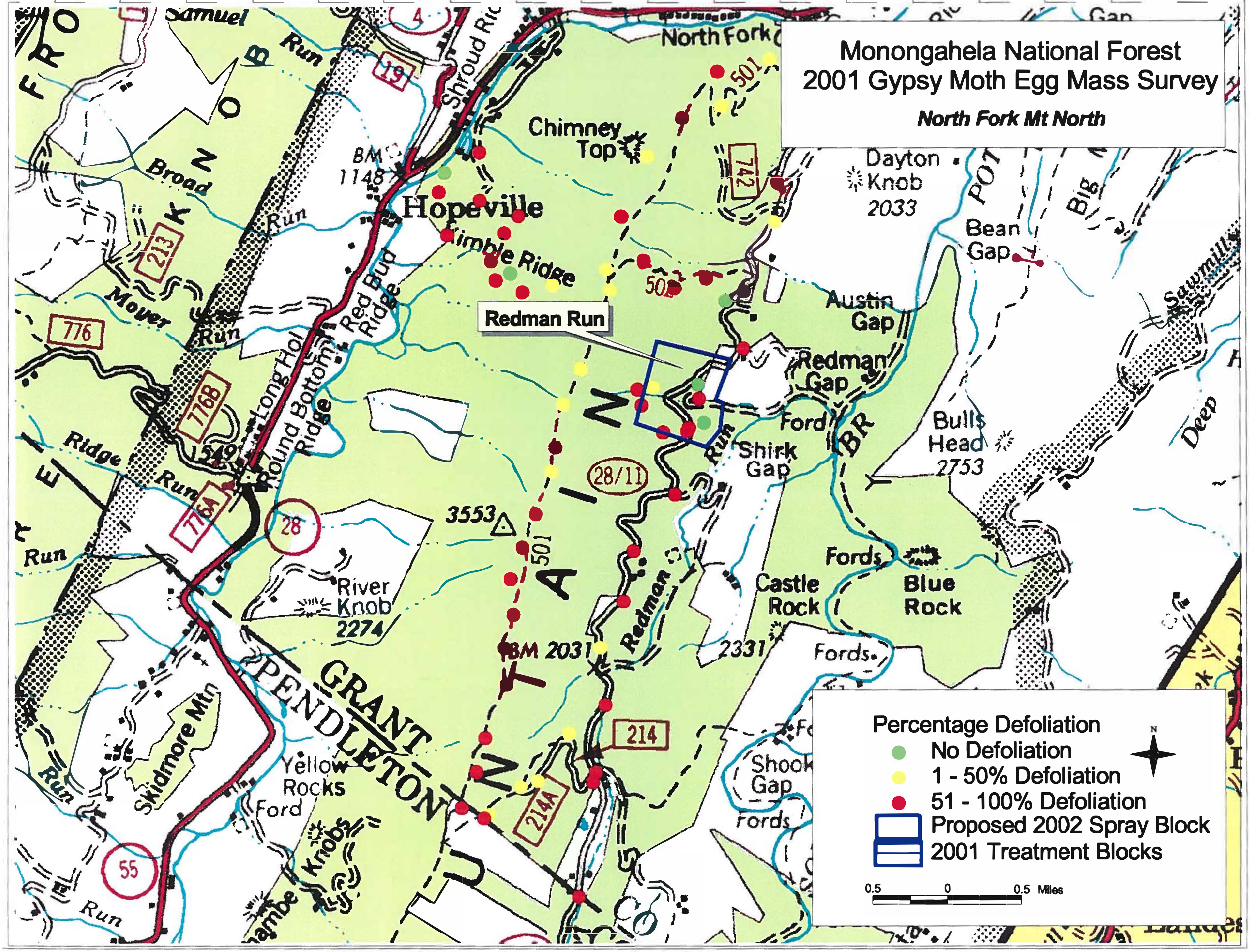
North Fork Mt Middle



Cave Mt North
N Fork Mt Lookout
Cave Mt South
Eagle Rock
SENECA ROCKS UNIT
(ADMINISTERED BY
MONONGAHELA NATIONAL FOREST)
TION AREA
Champe Rocks
Champe Knob
High Knob
Ketterman
2777
JESS JUDY
BIG BEND Campground
Seneca Rocks
SENECA ROCKS Picnic Area & Visitor Center
Roy Gap
Harper Knob
Smoke Hole Cave
Picnic Area
PIPELINE
Shuckleford Run
Powdermill Run
2864
High Knob
Twin Run
Briggs Ridge
Dry
55
28
2
220
501
79
744
745
810
809
909
2/3
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
▭ Proposed 2002 Spray Block
▤ 2001 Treatment Blocks
N
0 0.45 0.9 1.8 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

North Fork Mt North

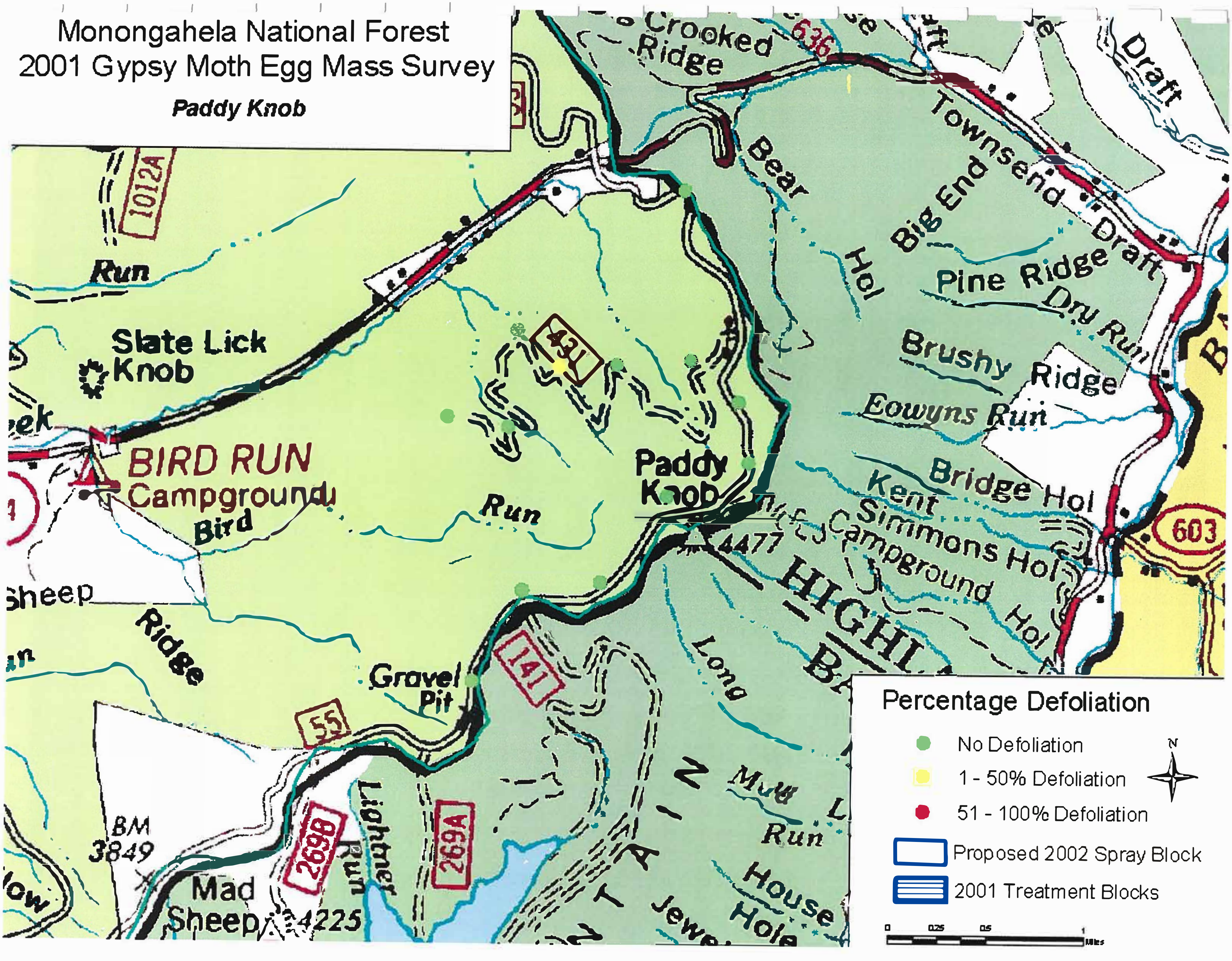

Redman Run
Hopeville
Chimney Top
Kimble Ridge
Dayton Knob 2033
Bean Gap
Austin Gap
Redman Gap
Ford
Shirk Gap
Bulls Head 2753
Castle Rock
Blue Rock
Fords
River Knob 2274
3553
BM 2031
2331
Yellow Rocks
Ford
Shook Gap
Skidmore Mtn
GRANT
PENDLETON
North Fork
Broad Run
Mover Run
Ridge Run
Long Hol
Round Bottom Ridge
Red Bud Ridge
Shroud Ridge
Redman Run
Sawmill
Deep
501
502
742
214
214A
28/11
28
4
19
55
213
776
776B
776A
BM 1148
1549

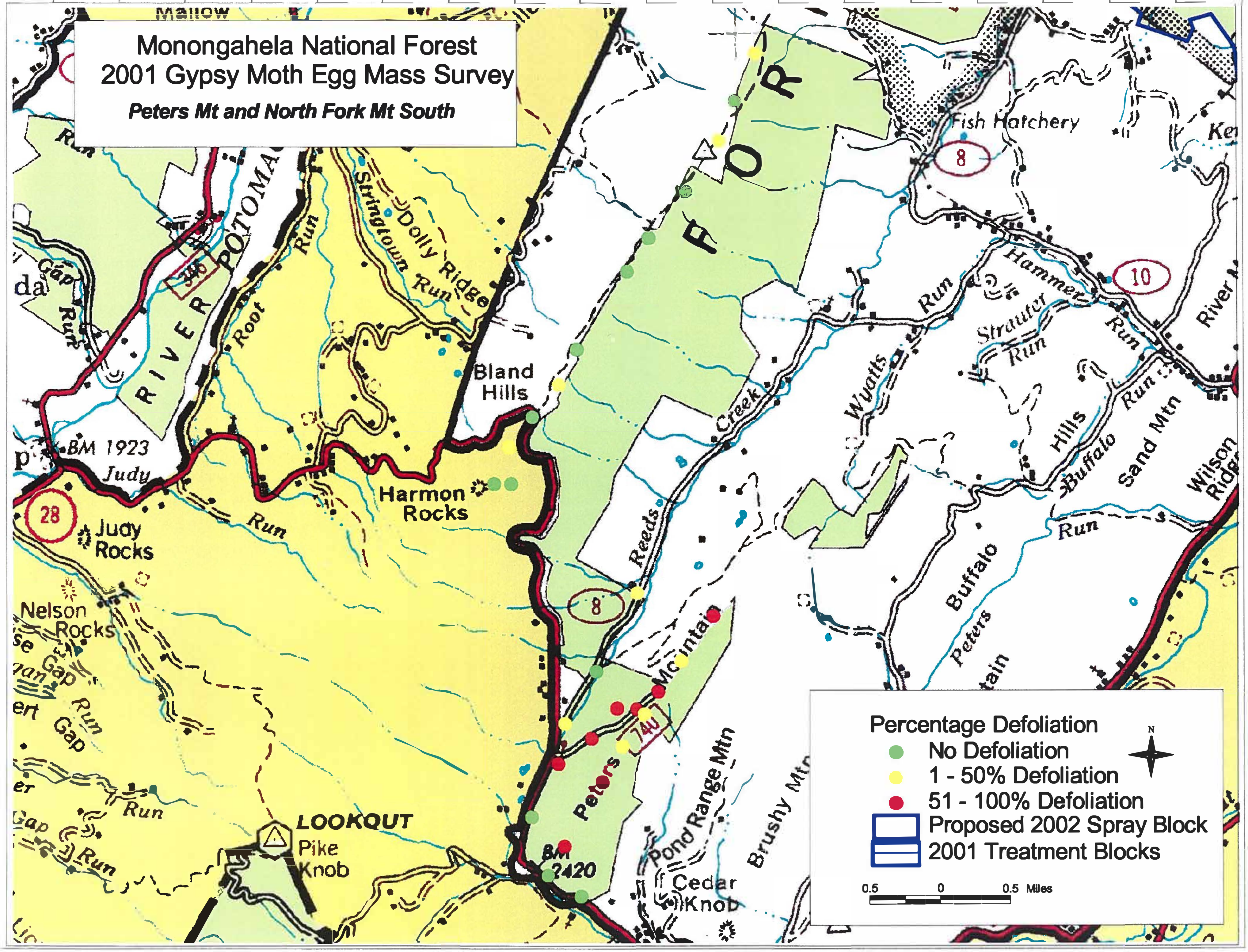
Percentage Defoliation
- 🟢 No Defoliation
- 🟡 1 - 50% Defoliation
- 🔴 51 - 100% Defoliation
- ▭ Proposed 2002 Spray Block
- ▭ 2001 Treatment Blocks

N
0.5 0 0.5 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Paddy Knob

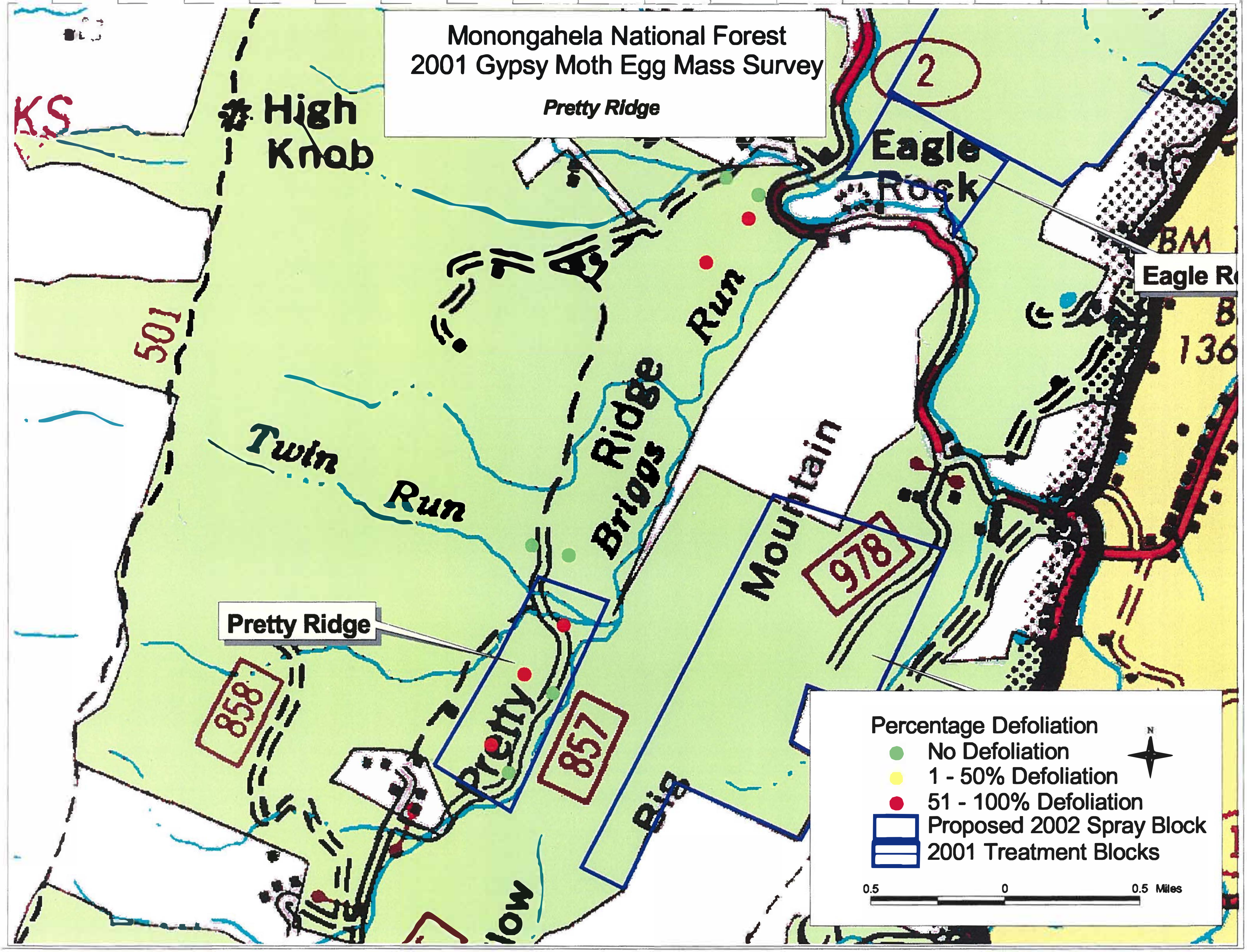

Crooked Ridge
636
Draft
Townsend Draft
Bear Hol
Big End
Pine Ridge
Dry Run
Brushy Ridge
Eowyns Run
Bridge Hol
Kent Simmons Hol
Campground Hol
603
1012A
Run
Slate Lick Knob
BIRD RUN
Campground
Bird Run
431
Paddy Knob
4477
HIGHL
Sheep
Ridge
Gravel Pit
141
55
269B
Lightner Run
269A
Long
Mule Run
House Hole
Jewe
BM 3849
Mad Sheep 4225
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
▭ Proposed 2002 Spray Block
▤ 2001 Treatment Blocks
N
0
0.25
0.5
1
Miles



Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

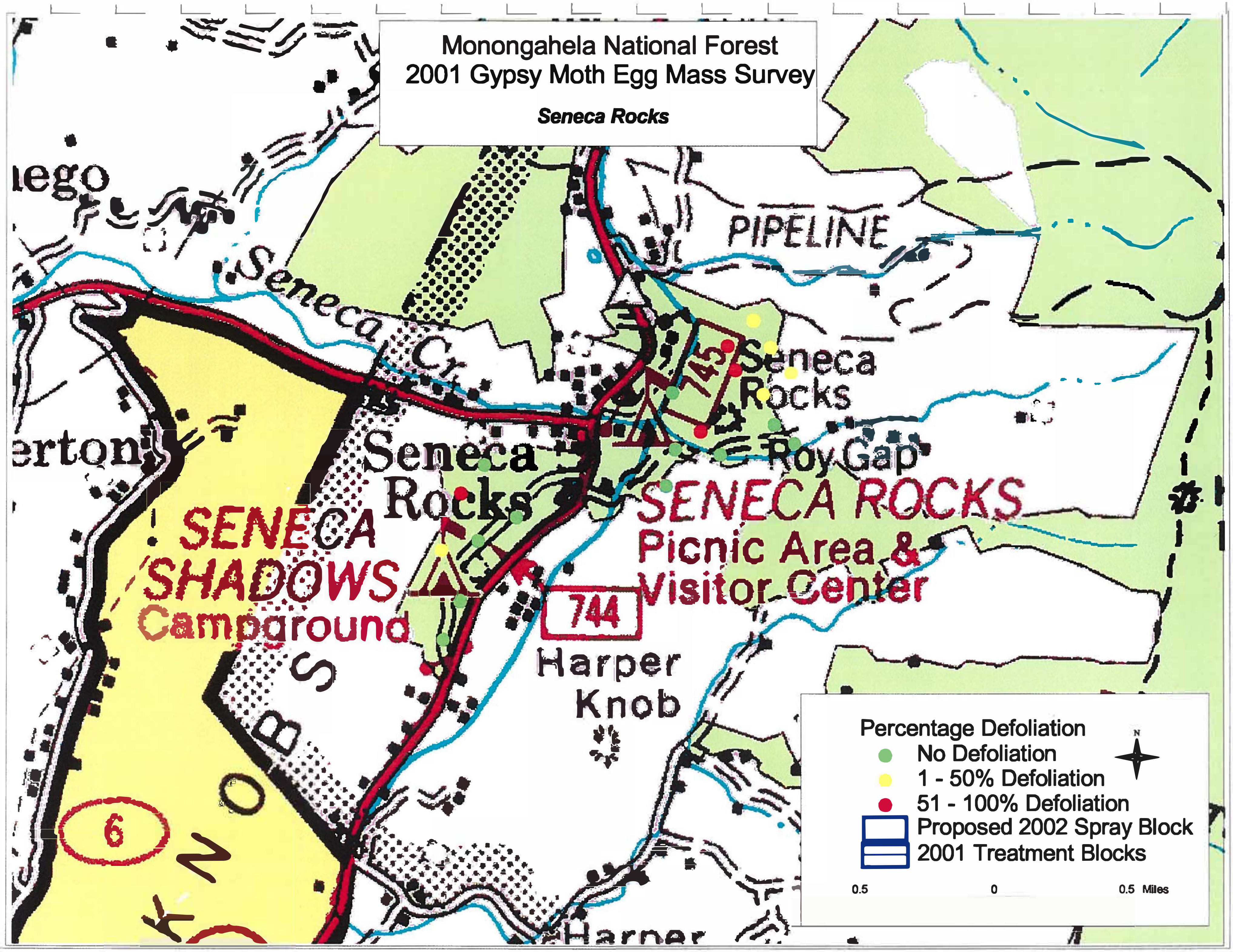
Peters Mt and North Fork Mt South

Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles
Mallow
Run
Gap
da
Run
RIVER
POTOMAC
Root
Run
Stringtown Run
Dolly Ridge
Bland Hills
BM 1923
Judy
Run
28
Judy Rocks
Harmon Rocks
Nelson Rocks
Gap
Run
Gap
Run
Run
LOOKOUT
Pike Knob
Reeds Creek
8
Mountain
740
Peters
BM 2420
Pond Range Mtn
Brushy Mtn
Cedar Knob
FOR
Fish Hatchery
8
10
Hammer Run
Run
Wyatts
Strauter Run
Hills
Buffalo Run
Sand Mtn
River
Wilson Ridge
Buffalo
Peters
tain

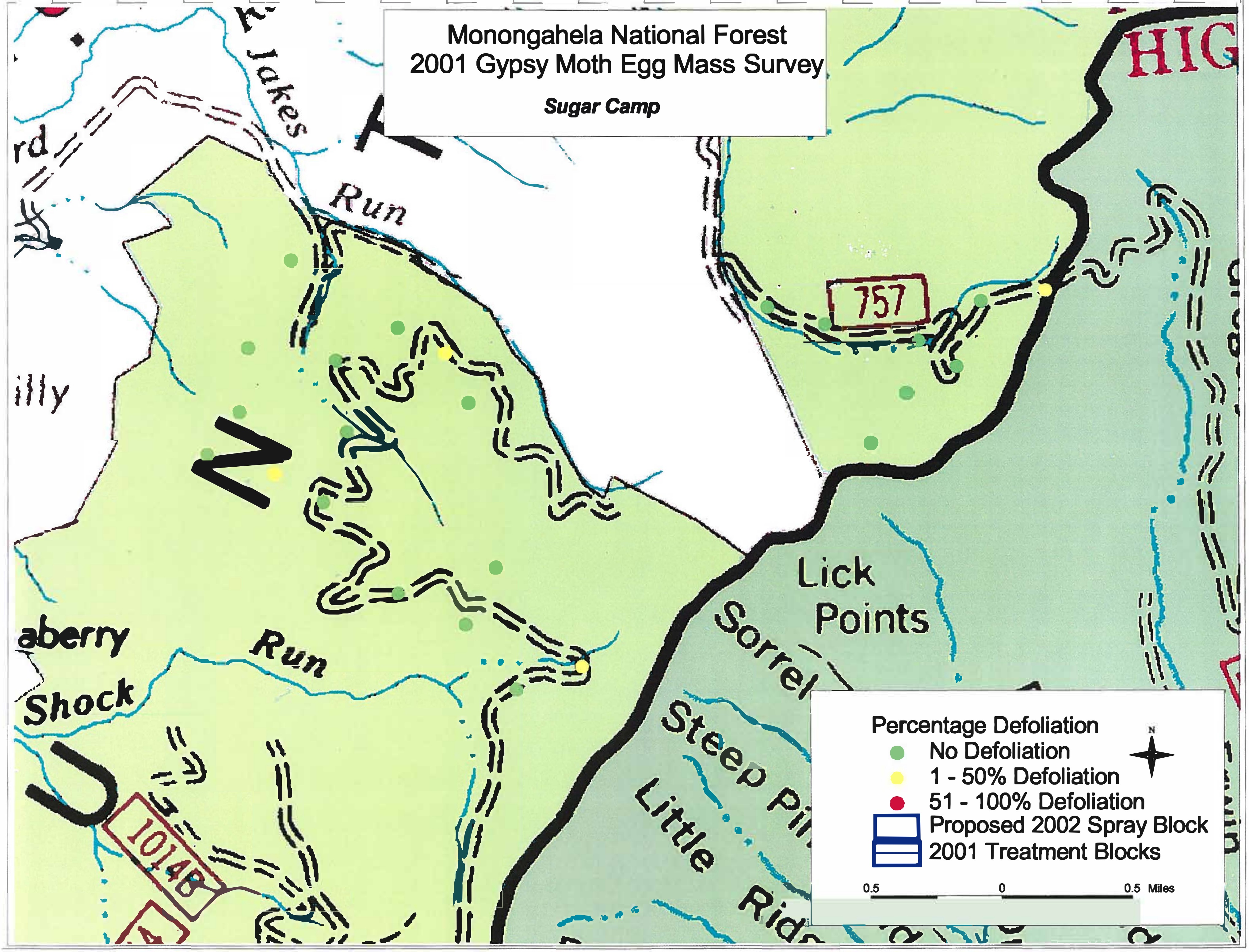
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey
Pretty Ridge
High Knob
KS
501
Twin Run
Run
Ridge
Briggs
Eagle Rock
2
Eagle R
BM
136
Mountain
978
Pretty Ridge
858
Pretty
857
Big
low
Percentage Defoliation
No Defoliation
1 - 50% Defoliation
51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Seneca Rocks



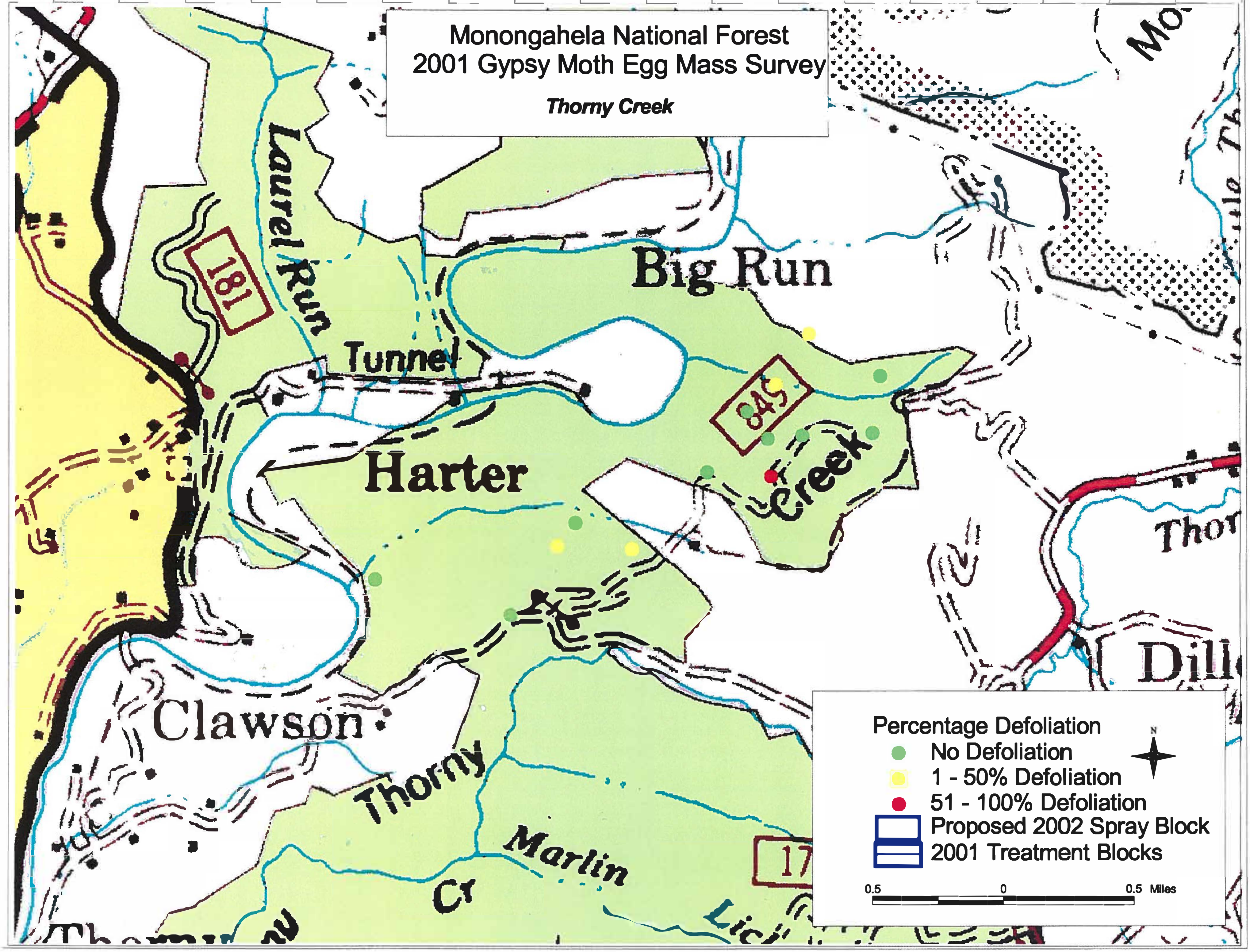
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
0.5
0
0.5 Miles
N
PIPELINE
Seneca Cr.
Seneca Rocks
Seneca Rocks
Roy Gap
SENECA ROCKS Picnic Area & Visitor Center
SENECA SHADOWS Campground
745
744
6
Harper Knob
Harper
BSONK
lego
erton



Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Sugar Camp

Jakes
Run
rd
illy
N
aberry
Run
Shock
U
10148
757
HIG
Lick
Points
Sorrel
Steep Pi
Little
Rid
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
Proposed 2002 Spray Block
2001 Treatment Blocks
N
0.5
0
0.5 Miles



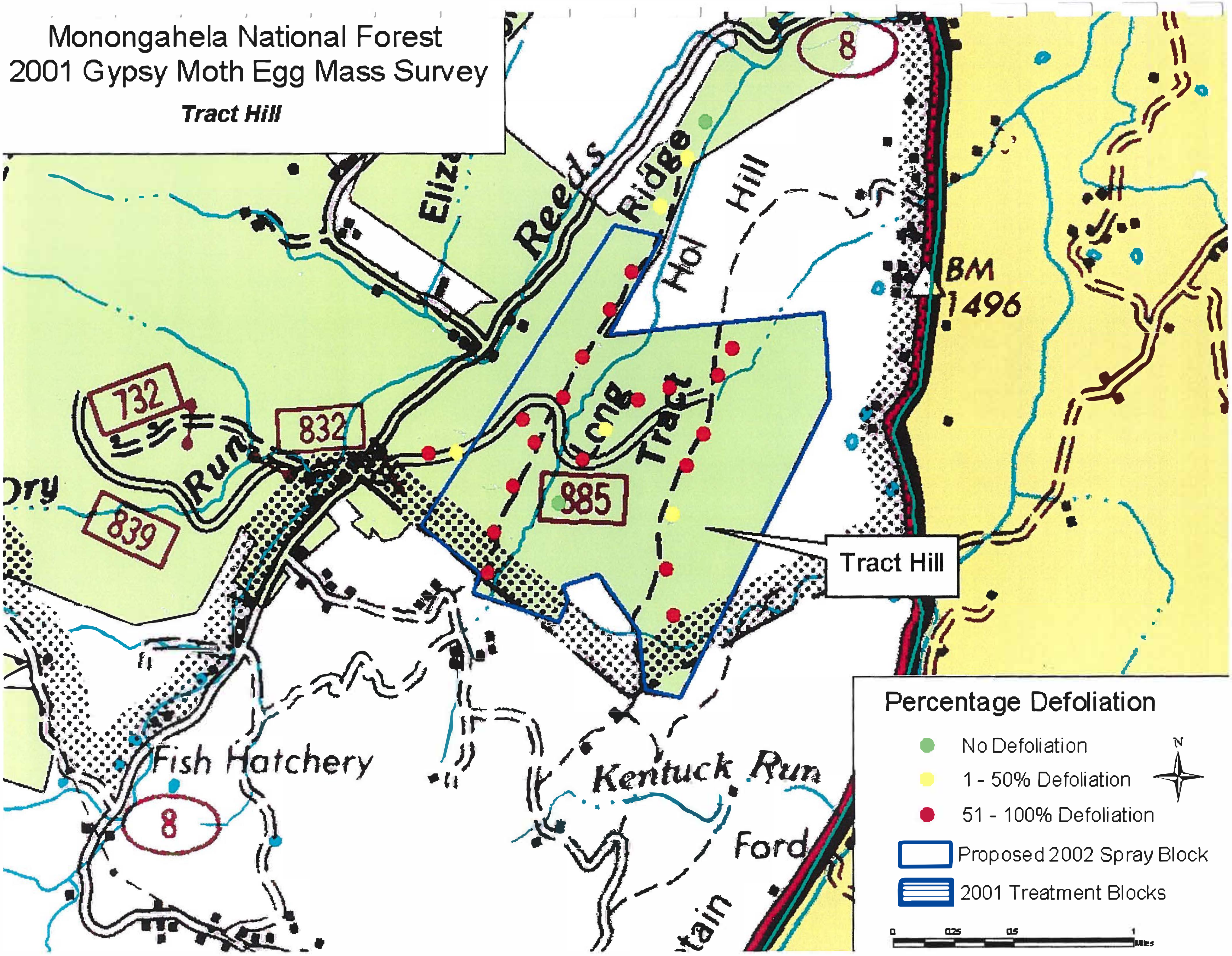
Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Thorny Creek

Laurel Run
181
Tunnel
Big Run
849
Creek
Harter
Clawson
Thorny
Marlin
Cr
17
Percentage Defoliation
🟩 No Defoliation
🟨 1 - 50% Defoliation
🟥 51 - 100% Defoliation
☐ Proposed 2002 Spray Block
☐ 2001 Treatment Blocks
N
0.5
0
0.5 Miles

Monongahela National Forest
2001 Gypsy Moth Egg Mass Survey

Tract Hill


8
Reeds
Ridge
Eliza
Hol
Hill
BM
1496
Long
Tract
732
832
Run
Dry
839
885
Tract Hill
Fish Hatchery
8
Kentuck Run
Ford
tain
Percentage Defoliation
● No Defoliation
● 1 - 50% Defoliation
● 51 - 100% Defoliation
▭ Proposed 2002 Spray Block
▤ 2001 Treatment Blocks
N
0
0.25
0.5
1
Miles